The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXVI. NEW YORK, SATURDAY, DECEMBER 5, 1903. No. 23.

THE ENGINEERING AND MINING JOURNAL
MINING AND METALLURGY — ESTABLISHED 1866

PUBLISHED EVERY SATURDAY,

261 BROADWAY, NEW YORK.

TELEPHONE 6865 CORTLANDT. P. O. BOX 1833.
CABLE ADDRESS "ENGMINJOUR" NEW YORK.

W. J. JOHNSTON, President. F. J. PRATT, Treasurer.

T. A. RICKARD . . . . . EDITOR
FREDERICK HOBART, SAMUEL SANFORD . . . . . ASSOCIATE EDITORS

SPECIAL CONTRIBUTORS.

NEW YORK . . . . . R. W. RAYMOND, J. PARKE CHANNING, JOHN A. CHURCH, JOSEPH STRUTHERS
BOSTON . . . . . W. R. INGALLS
PHILADELPHIA . . . . . F. LYNWOOD GARRISON, R. A. F. PENROSE, JR.
SCRANTON, PA. . . . . WM. GRIFFITH
ANSTED, W. VA. . . . . W. N. PAGE
SPRINGFIELD, ILL. . . . . EDWARD H. COXE
WASHINGTON . . . . . S. F. EMMONS, J. E. SPURR, W. H. WEED
DENVER . . . . . PHILIP ARGALL, C. W. PURINGTON
SAN FRANCISCO . . . . . LOUIS JANIN, JR., CHARLES G. YALE
LONDON . . . . . A. G. CHARLETON, HENRY F. COLLINS, J. H. CURLE, T. KIRKE ROSE
JOHANNESBURG . . . . . T. LANE CARTER, G. A. DENNY
SYDNEY . . . . . F. DANVERS POWER

SUBSCRIPTION, payable in advance, $5.00 a Year of 52 numbers, INCLUDING POSTAGE in the UNITED STATES, CANADA, MEXICO, CUBA, PORTO RICO, HAWAII or the PHILIPPINES.

TO FOREIGN COUNTRIES, INCLUDING POSTAGE, $8.00 or its equivalent: 33 Shillings; 32 Marks; or 40 Francs.

ADDRESSES CHANGED WHENEVER DESIRED.

In requesting change of address give OLD as well as new address.

NOTICE TO DISCONTINUE.

Should be WRITTEN to the New York Office in every instance.

Remittances may be made by P. O. Order, Express, Draft on New York or Registered Letter at our risk.

BRANCH OFFICES:

CHICAGO, Telephone, Harrison 3326 . . 520 Monadnock Block
PITTSBURG, Telephone, 504 Court . . 701 Keystone Building
DENVER. . . . . 206 Boston Building
SALT LAKE CITY . . . . . 76 East Fifth South St.
BUTTE, MONTANA . . . . . 19 & 20 Owsley Block
SAN FRANCISCO . . . . . 168 Crocker Building
VANCOUVER, BRITISH COLUMBIA . Molson's Bank Building
LONDON, ENGLAND. . . . . 20 Bucklersbury, E. C.
DORTMUND, GERMANY . . . . Arndt Strasse 56

ADVERTISING COPY.

Should reach NEW YORK office by MONDAY morning of issue week; CHANGES OF COPY by the PRECEDING THURSDAY.

Copyright, 1903, by THE ENGINEERING AND MINING JOURNAL.
Entered at New York Post Office as Second Class matter.

CONTENTS.

Editorials:
Notes 839
Some Aspects of Mining Finance.—II. 840
The Geological Survey and Mine Litigation 841
The Position of Copper 841
Market Conditions 841
Metallics 842
Editorial Correspondence:
Conditions in the Anthracite Region 842
Discussion:
Mesh v. Aperture ..... *Philip Argall* 843
Cyanide Practice at the Ymir ..... *F. L. Bosqui* 843
Card Systems for Mine Accounts. *R. Gilman Brown* 843
*Precipitation from Cyanide Solutions, *Herbert A. Megraw* 844
Determination of Gold and Silver in Cyanide Solutions, *Robert Grauer* 844
Mineral Resources of Indo-China 844
The Geological Survey and the Butte Litigation 845
Gold Dredging in Victoria 845
The California State Miners' Association 846
Delprat's Method of Separating Mixed Sulphide Ores .. 846
Shaft Sinking in Southeastern Missouri 846
*The Wisconsin Zinc Fields ..... *Frank Nicholson* 847
*A System of Handling Sand Mechanically for Cyanide Vats ..... *Charles Butters* and *Albert F. Crane* 850
Sulphuric Acid Manufacture by the Contact Process .. 852
*Present Condition of Gold Mining in Arctic America.—II. ..... *R. A. F. Penrose, Jr.* 852
Prevention of Dust in Mines .... *Charles B. Brodigan* 854
Construction of Wooden Water Tanks 855
*The Moore Slimes Process at the Consolidated Mercur Gold Mines ..... *George Moore* 855
The Status of Steel Billets 856
Abstracts of Official Reports:
Greene Consolidated Copper Company 857
Consolidated Gold-Fields of South Africa 857
Books Received 858
Books Reviewed 859
Correspondence:
Wire Rope Tramways ..... *S. de Zombory* 860
Recent Decisions 860
Questions and Answers 860
Patents Relating to Mining and Metallurgy:
*United States 861
Great Britain 862

Illustrated.

DEPARTMENTS.

Assessments 875
Chemicals and Minerals:
New York 873
Foreign 874
Coal Markets:
United States 871
Foreign 872
Dividends 875, 878
Financial Notes:
Gold and Silver Movement 874
Prices of Foreign Coins 874
U. S. Mint Coinage 874
Industrial Notes 863
Iron and Steel Markets:
United States 872
Foreign 873
Metal Markets:
Silver 874
Copper, Tin, Lead, Spelter and Minor Metals 874
Average Monthly Prices Tables 875
Mining News:
Summaries: Denver, San Francisco, Spokane 864
London, San Luis Potosi, Mex., Sydney, N. S. W., Perth, W. A., Toronto, Victoria, B. C. 865
United States 865, 868
Foreign 869
Mining Stocks:
Market Reveiws 870
Quotations 876, 877
Obituary 863
Personals 863
Schools, Technical 863
Societies 863
Trade Catalogues 864

EDITORIAL.

RECENT CHANGES in the printing arrangements have made it possible to mail the ENGINEERING AND MINING JOURNAL to its subscribers earlier in the week than heretofore. The change does not affect the date of the news, or of the market quotations, given in the JOURNAL, which will be brought each week up to the close of business on Wednesday of that week. The paper, however, is mailed on Thursday night, instead of Saturday morning, as heretofore; and it should reach subscribers at a corresponding date.

In order to conform the date line of the JOURNAL to the new arrangements it will be, next week, changed from Saturday to Thursday. The change, of course, is not a material one, but it has been thought best to use a date in accordance with the facts. The next issue will be, therefore, dated December 10, or only five days after the present one, and the numbers will be dated on each Thursday thereafter.

WE FIND IT necessary to repeat now a statement which we have frequently made heretofore. It is impossible for the ENGINEERING AND MINING JOURNAL to give its readers, as individuals, special information about mines, or advice about mining investments. The news collected by our special correspondents is published for the benefit of all our readers, and it is our constant effort to make this information as full, and as correct, as possible. This is our proper work; to go beyond it and give estimates of the value, or probable value, of specified mines is entirely outside of our province. It could not be done without making investigations and examinations, which would involve labor and expense far in excess of the benefits to be secured. Moreover, it would not be fair or just to our readers generally to furnish special information to a few of them; and the letters asking for such information, though they are many in number, come from only a small proportion of the whole. Those who read this will understand why requests for advice about the purchase of mining stocks remain unanswered.

THE MINES OF THE RAND produced 285,000 ounces of fine gold during the month of November; this is the highest yield since the war and compares with 393,310 ounces for the corresponding month of 1898. Every month sees an increase, which, slight as it is and amounting only to about 10,000 ounces, is, nevertheless, indicative of steady progress under difficulties arising from a lack of an adequate labor supply.

THE REVIVAL OF an old mining district, which was virtually abandoned years ago, is always an interesting fact. This is especially the case when the district, apparently worked-out under cruder methods, now appears to have great possibilities. The paper on the Wisconsin zinc-ore deposits, by Mr. Frank

Nicholson, which is given elsewhere, relates to such a district. The operations now in progress there promise much for the future, and it seems quite probable that an important mining industry may be developed there, which will compete with the Missouri and Kansas mines as a source of supply of zinc ores.

REPORTS FROM Dawson City put the amount of gold entered there, from mines in the Canadian Yukon, at $10,500,000 for the season. This is a decrease of about $1,500,000 from the season of 1902. Some falling off was expected, but the production is still large. Conditions in the Yukon were well shown in the article on that region, a part of which was published in our last issue, while the remainder is given on another page of the present number.

EXPLORATIONS FOR iron ore in northern and western Ontario have been quietly, but diligently, continued through the past season. It is understood that some success has attended these operations, and that discoveries have been made which promise to be of value. In some cases the results have been kept as quiet as possible, for reasons that will be readily understood. We hope, however, to be able to give a report on this subject at an early date.

THE ELMORE PROCESS of concentration by the use of oil is now at work successfully at the Le Roi No. 2 mine, at Rossland in British Columbia. It seems to be well adapted to the ores of that district, and will probably be adopted at other mines. This is the first working installation of this process in the United States or Canada. The reports of the process from abroad have excited a good deal of interest here, and the results obtained at the Le Roi plant will be carefully watched. Though it is not adapted to all ores—as some people seem to think—the process has a considerable field. Its advantages and limitations have been fully treated in our columns.

THE STRIKE OF the Colorado coal miners is still unsettled, and it looks as if it would last longer than was at first anticipated. It has been supplemented by the strike in Utah, where the miners seem to be even more bitter, and more inclined to make trouble, than in Colorado. Meantime, fuel is growing scarce in the Rocky Mountain district. Unless a settlement is reached soon, Colorado people will have to get coal from the States along the Mississippi. Coal is beginning to be forwarded from Missouri, in spite of the cost of the long rail haul. The need of fuel will soon be imperative, and it can be met only by taking coal from the nearest States. This will make a considerable demand for Iowa, Kansas and Missouri mines—if the strike is not ended soon.

Latest advices are that the strike in the Northern coal-field is to be settled, but that in the more important Southern field continued. The Northern settlement, however, may influence the other miners.

THE ELEVENTH MONTH of the year shows the effects of the continued labor disturbances in important metal mines of the West, to the extent that dividend payments have been reduced to a comparatively small figure. In November, 25 metal mines reported dividends of only $2,672,619, of which 20 mines producing gold, silver and lead, contributed the small sum of $628,189, although Camp Bird, of Ouray, Colo., and the Daly-West and Silver King mines, in Utah, distributed large dividends individually. Of the balance, one Arizona and three Montana copper mines disbursed $1,744,430 as their regular dividends, and $300,000 came from a zinc property. Industrial companies, closely identified with the mineral industry, have also suffered from labor troubles and a falling market for their products. Eighteen of these concerns paid dividends, during the month, of $10,963,871, of which the United States Steel Corporation alone furnished $8,929,919 as a regular quarterly dividend of 1.75 per cent on its preferred stock.

At the same time eight Mexican mines and metallurgical works yielded dividends of $109,180 gold, mostly regular monthly payments.

SOME ASPECTS OF MINING FINANCE.—II.

We have seen more than one prospectus, issued of late by exploration companies organized in New York, in the pages of which reference has been made to the successes of similar undertakings in London and elsewhere. Several English organizations are quoted by name as examples of this kind of business activity, but it indicates how little is known concerning the ins and outs of the London arena, when three or four corporations, of entirely dissimilar character and methods, are given as models for American enterprise. On the other hand, the mere fact that London has been the leading mining market of the world since the modern development of mining began, warrants our turning thither for examples of well-considered methods in the management of financial organizations. By the mining men of this country, the Exploration Company has long been held as the typical London house making a business of promoting mining undertakings. In many respects there is a warant for this, although it must not be assumed that even this highly reputable concern has been uniformly successful. A few years ago it illustrated the dangers of ill-considered and reckless finance by taking up mines in Australia, for instance, without much regard for business caution; and finally embarked in tramway enterprises in Paris, which entailed a loss of fully $3,500,000. The Exploration Company has paid for its experience, and in returning, of late, to conservative mining, it has recovered much of the ground lost during a period of poor administration. Experience teaches, and whatever methods this company may now employ are those therefore which, after trial, appear most likely to eliminate the risks of mining as much as possible, while at the same time giving that *quid pro quo* which is the essence of sound business.

Some of the recent methods adopted in connection with well-known mines will prove suggestive to those who set out on the same quest.

When the Exploration Company acquired El Oro mine, they took an option to purchase, from Mr. Haggin and his partners, the whole of the shares of the American mining company, which owned El Oro mine, and then formed the English company with a capital of £900,000: this represented the cash purchase consideration for the property, plus working capital, and left some few thousand shares unissued, in the hands of what is now El Oro Mining & Railway Company. In other words, the Exploration Company turned over the property complete to the English organization at absolute cost and without adding a dollar by way of profit, and, in addition to all this, itself defrayed the cost of registration and all the expenses incidental to the formation of the new company. The Exploration Company then solicited subscriptions from its friends in London toward the capital of El Oro Mining & Railway Company, charging them 5 per cent, or one shilling per share, which represented the Exploration Company's profit; but inasmuch as the vendors took a large number of shares in lieu of cash, and could not, therefore, be asked to pay this one shilling per share, and as, of course, the amount subscribed by the Exploration Company itself did not represent any profit, and as it also had to pay commissions, expenses, flotation charges, and so forth, out of the profit it did receive in this manner, the net gain on this large transaction did not exceed £15,000. It is perhaps the only instance in which an English company has acquired a property at absolute bedrock cost and, barring that satisfactory result of the transaction, it cannot be said that this method of treating a property is a good precedent or a reasonable business proposition.

In the case of the Tomboy mine, the Exploration Company followed what is known in London as the Hamilton Smith practice; that is to say, they purchased 51 per cent of the shares of the American company, and merely subscribed, and induced their friends to subscribe, for the shares in that company. Subsequently, finding this scheme did not work at all, they persuaded the American directors to sell out the whole business to a company formed in London, and the American stockholders now hold shares in the English company, instead of the English stockholders holding shares in the American. This is also a practice which does not at all commend itself, for while 51 per cent, of course, gives the control of a property, it is obvious that the sale of a few thousand shares will transfer that control.

The practice now adopted by the Exploration Company is approximately as follows: If a mining property is brought to the notice of any one of its representatives, and he (an engineer) is satisfied with the preliminary investigation, they arrange to take an option upon the property, preferably for about three months, and if it then holds up to a complete and searching examination, they, prior to the expiration of the option, form a company in London to acquire the mine, making themselves responsible for the purchase, offering to their friends a participation in the underwriting, for which probably a commission of 5 per cent in cash is paid; then they make a public issue, and if the business is of sufficient dimensions they reserve a certain number of shares for preferential allotment to the shareholders of the Exploration Company, should they be disposed to make application for the same.

The capital of such a new company is fixed at the cost price of the property, plus whatever may be necessary for working capital, and, in addition, a sum anywhere from 5 to 10 per cent, according to the size of the property, is set aside as the promoters' (Exploration Co.'s) profit; unless a mine, on examination, shows that it can stand such promoters' profit and still present a good mining chance of giving the shareholders their money back with a substantial rate of interest, it is not considered good enough to put on the market. Of course the amount of commission which the promoters should add to the purchase price would very largely depend upon the size of the property, for what might be a reasonable percentage on a purchase price of $500,000 would be excessive and unreasonable on a property of $5,000,000.

The phrase 'underwriting the capital' means that the organization bringing out a company with a capital, say, of £1,000,000, would by themselves and their friends undertake to subscribe for the whole or any portion of the capital not taken by the public, and in consideration for such guarantee they would be paid an underwriter's commission of, say, 5 per cent. The foregoing, of course, only applies to mining properties which would be too big for the promoting organization to handle alone, but in the case of any mine which could be purchased and equipped for, say, $500,000, or even $1,000,000, it

would, if the property was considered to have very good prospects, be much disposed to take the whole for its own account, and just work it as a private business.

THE GEOLOGICAL SURVEY AND MINE LITIGATION.

On another page we publish a copy of a letter addressed by the Director of the United States Geological Survey to Mr. F. Augustus Heinze, who controls the important mining interests rendered celebrated by their long legal conflict with the Amalgamated Copper Company. In order to explain the circumstances leading up to Mr. Walcott's communication, we publish also three other letters exchanged by the parties in interest during the current year. These four letters explain themselves.

The unfortunate controversy to which this correspondence gives expression is, we believe, due largely to a misunderstanding, itself complicated by a little bitterness, arising from the fact that a member of the Survey, who helped in the preparation of the Butte report of 1897, was subsequently retained by Mr. Heinze. This act of a junior geologist embarrassed the officers of the Survey, as it was considered by them to establish a regrettable precedent. As might be expected, it occasioned friction between several of the gentlemen resident at Butte and introduced another undesirable element into a litigation already bitter enough. When, finally, the preliminary paper, covering the broad outlines of Butte geology, as determined by the work of the last three years, was published by the Survey, it is quite intelligible that the engineers on Mr. Heinze's staff should be on the lookout for any details which they might suppose hurtful to their case in the courts. As far as we can determine, Mr. W. H. Weed's paper, an abstract of which was promptly published in this JOURNAL, was so general in its description as to afford little service to the litigants at Butte. We certainly believe that this was its intent. However, soon afterward certain experts, when testifying in behalf of the Amalgamated Copper Company in the Nipper case, did quote some of Mr. Weed's data and thereby, most naturally, aroused the ire of Mr. G. H. Robinson and other engineers of the opposite side. If anyone is to blame in this whole matter it appears to us that the gentlemen who dragged the scientific publication of the Survey into their disputes over mining territory are the persons to be arraigned. As a matter of fact, Mr. Heinze won the Nipper suit, and it does not appear, therefore, that the use of Mr. Weed's data helped the Amalgamated in this instance. It is quite obvious that the researches of the Survey are not intended to aid any litigant, and are prepared solely for the purpose of elucidating the general character of ore-deposits in our mining districts; it seems a great pity, therefore, that the public should be debarred such assistance in the development of mines, merely because two large interests wage an interminable vendetta, and are ready to employ such scientific findings to their own ends in the courts.

All this has been said from the point of view of the mining profession; this, we desire to emphasize, is our standpoint always. In so far as Mr. Heinze furthers the best interests of the mining industry, and he has furthered them in certain directions by his extraordinary energy, we shall gladly recognize his rights, while as to the United States Geological Survey, we certainly feel that the occasion will be an extraordinary one, when that corps of scientific investigators is not aiding the best interests of mining. This we can say all the more frankly because the ENGINEERING AND MINING JOURNAL has no connection whatever with the Survey; a year ago such was not the case; two distinguished officers of the Survey were at the head of our editorial department; but such a relation no longer exists, nor will it exist again, we hope. We hope so, simply because it is desirable that this JOURNAL should be as independent of the Survey as of the mine-owners, the miners' unions, or any other interests which might hamper the free expression of opinion and the formation of a judgment which, wrong as it must often be, can be at least without prejudice.

THE POSITION OF COPPER.

The depression in speculative circles and the decline in business—more apparent than real—together with the concurrent, if not concerted, action of large purchasers, have combined to depress the price of copper. After a considerable period of higher quotations, we have now come close to 12-cent copper, and it may possibly go below that point. There are influences in the market tending in that direction, and there seems to be a lack of confidence in the future, which, we think, is not warranted by the facts.

It is extremely unfortunate, in the case of a staple material like copper, that it is very difficult to obtain reliable statistics. This is due to the action of the largest producer in withholding information, for reasons which can be generally understood. This action leaves the trade in the dark, to a large extent, and makes an opening for speculative operations, which benefit a few parties, but are decidedly detrimental to the trade at large.

The production of copper this year has doubtless increased over that of last year, the gain being not far from 10 per cent, as nearly as can be estimated. The stoppage of the Amalgamated mines in Montana did not last long enough to cause any great deficit in output, and the loss there was more than made up by the metal from the newer mines in the Lake Superior country, in Arizona and in Utah. The output in the United States is not far from 55,000,000 lb. per month, of which the Amalgamated properties in Montana were producing 20,000,000 lb. per month just before the shut-down, and they are now turning out about the same.

The imports of copper have increased somewhat over last year, the gain coming both from Mexico and Canada. This increase, however, has not been sufficient to cause any alarm.

Consumption, which was very large during the earlier part of the year, is said to have fallen off lately. At least, manufacturers complain that new orders are few. But we do not hear of any plants which have been obliged to shut down or to diminish their working forces largely. Moreover, there has never been a time when there were so many great enterprises on foot, in which electrical power is to be used; and these will require a very large quantity of the metal. Thus, in New York alone, we find the Pennsylvania tunnel work, the changes to be made on the New York Central's suburban lines, the Subway equipment, and the Atlantic avenue improvement on the Long Island road; all of these will absorb a great deal of copper. The list might be extended to many other places. All this does not point to a drop in consumption, now, nor for a year or two to come.

The weakest point in the situation is found in the smaller exports this year. Europe has not been as heavy a buyer as was expected, though recent months have shown some improvement. Whether the lower prices will bring about increased foreign trade is settled, as buying has increased.

In spite of the falling off in exports, there are no evidences of any considerable accumulation of stocks in sellers' hands. Probably there is now some surplus, but it cannot compare with the large unsold stocks which weighed upon the market two years ago. It is well understood that consumers are carrying very little copper. Both here and in Europe, manufacturers have little or no metal ahead; and they are constantly buying for immediate delivery.

Upon the whole, the situation is far from being a weak one; and the present prices are the result of temporary want of confidence, which keeps buyers back, rather than of the actual position of the metal. It is quite possible, however, that we may see little change before the close of the year.

MARKET CONDITIONS.

December 2, 1903.

The metal markets generally have shown a degree of dulness which reminds us that the close of the year is approaching, and that people are generally disinclined to enter into new arrangements, until their stock-taking is completed, and their balance sheets made up for 1903.

Copper has been dull and weak. The largest seller has shown willingness to make a low quotation, which has helped to discourage buying for the present. Foreign consumers, however, have taken hold at the lower prices, and a considerable business has been done for export. Some holders, however, are not pressing metal on the market at the present quotations, and actual sales here have been light.

Tin has been dull also, with only moderate fluctuations in price. Consumptive demand appears to be only fair.

In lead, about the usual business is doing at unchanged prices. Spot lead is temporarily scarce, and it is possible that a few car-loads may have been sold above the market, but the quantity must be quite small.

Spelter continues weak, and sales have been light, with quotations again showing a decline.

Silver has shown little change during the week, the demand from the East being only fair. There has been little change in prices during the week.

The iron market this week has shown a little more demand for raw material. Some people are inclined to think that consumers have made up their minds that pig iron prices are near the bottom. This is hardly shown, however, by the buying, which has been mainly in small lots for immediate delivery or simply to meet current necessities. The southern furnaces, however, have taken considerable business at the low prices, and it is understood that the large companies have cleared off their surplus stocks, and are inclined to ask 50c. a ton more for any new orders coming in. In finished material business has also been dull. It is understood that there are some large contracts for plates and for structural material pending, but these are held back with the expectation of lower prices. Steel billets remain unchanged. A meeting is to be held shortly to decide whether the billet pool shall be continued for next year.

In the western coal markets there has been a little spurt in the Lake business, shippers hurrying up to complete their contracts for the current season, before navigation closes. This has led to a temporary rise in freight rates, as coal carriers are getting to be rather scarce. Locally, domestic trade has been stimulated by cold weather, but factory trade is rather dull. The demand for coke is also lighter and business rather slack.

The Seaboard bituminous coal trade shows no change in conditions. Shippers have been rather disturbed by troubles with the railroads, and some

operators claim that they are not getting more than half the cars which they need for their current business. Prices at tidewater, for standard coal, are a little better.

Anthracite trade is steady, with little change in conditions. The continued cold weather has helped domestic sales, but the steam coal trade is not particularly active.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The East shaft at the New Kleinfontein mine, in the Transvaal, was sunk 858 ft. in the five months, January-May, 1903. The best work was in May, when 213.5 ft were made. The average cost of sinking was $66.22 per foot in depth.

The first explosion of fire-damp in a British colliery of which there is authentic record occurred at Mostyn, in North Wales, February 3, 1675. It caused, we are told, general wonder and alarm.

Few people know that the first coal mning carried on in this country was in Virginia. A mine was opened in the Clover Hill coal-field, near Richmond, in 1750, and the coal was regularly sold in the neighborhood. Some years later it was sent as far as Philadelphia. The Clover Hill basin was of small extent, but it was worked until a few years ago.

The oldest quicksilver mine in the United States is the New Almaden, in Santa Clara county, in California. It was discovered and worked in 1824, when California was under Mexican rule, and was then known as the Chaboya mine. It was abandoned later and reopened in 1845. It has been worked continuously since 1850.

In ten years the consumption of cement in the United States has increased 144 per cent, being 28,402,466 bbl. in 1902. This increase is due to prosperity in building trades and to new uses for the material. Cement production in the United States has grown remarkably in ten years, being 26,165,934 bbl. in 1902, as against 8,119,939 bbl. in 1893. An important era in American cement construction came in with the application of reinforced concrete to large buildings, making them practically monoliths of artificial stone.

Quartz glass is a new material made by melting pure quartz crystal before the oxyhydrogen flame. The melting point of quartz is about 1,700° C., or only 80° below that of platinum, so that its manipulation in a molten condition is extremely difficult and laborious. By reason of its superior hardness, transparency and low index of expansion, the glass is admirably suited for the manufacture of scientific instruments.

The earliest mention of coal in the United States is made by Father Louis Hennepin, in his account of explorations in the West. He found coal in 1679 on the Illinois river, at a point near the present town of Ottawa. The good father was a missionary, not a miner; and he speaks of 'mines,' probably meaning outcrops of coal merely.

The recovery of tin from tin-plate scrap is extensively carried on in Germany, the stannate process being employed. By this method the scrap is subjected to a bath of electrolyzed sodium hydrate, which reacts upon the tin to form soluble sodium stannate. Good scrap yields from 2 to 3.5 per cent tin.

CONDITIONS IN THE ANTHRACITE REGION.

EDITORIAL CORRESPONDENCE.

Labor conditions in the Schuylkill region differ somewhat from those prevailing in the Lehigh and Wyoming-Lackawanna regions. There is not a strike of any importance in the whole Schuylkill country, while there is one in the northern districts, that at the Red Ash mine near Wilkes-Barre. On the other hand, while the men in the Wyoming-Lackawanna region are apparently pretty well satisfied with existing conditions, in the Schuylkill the men employed by the Philadelphia & Reading have made a grievance out of their being required to work nine hours on Saturday—in compliance with the ruling of the Arbitration Commission that nine hours should constitute a day's work. Before the strike the company had a custom of letting the men off in the afternoon and giving them a whole day's pay for less than a day's work.

The men held that, in view of the wording of another of the Arbitration Commission's findings, to the effect that local conditions of work should not be changed, a local custom like the hours off on Saturday took precedence over a specific ruling as to hours of labor. The Conciliation Board, which considered the matter recently, could not agree, and Mr. Carroll D. Wright, the umpire, is expected to give his decision soon.

It is said, though not on the best authority, that if the umpire's decision is against the men, the officials of the United Mine Workers will have to work hard to keep the men in line. The latter are making high wages; $100 a month is not an uncommon figure for good men on contract work, and there are occasional instances of men earning $150 a month, and even more. These wages and the consciousness of power through their union make the men independent, and liable to stop work at small provocation. It is also said that many miners are dissatisfied because they have not obtained even larger advantages from the strike, and that certain local lodges of the United Mine Workers show a great falling off in paid-up membership, in one case the decrease being from 240 to 40 members. Thus, between attempts to keep up the membership and prevent men from violating the awards of the Arbitration Commission by striking without cause, the officers of the United Mine Workers may have their hands full by next spring.

So much for the labor situation in the anthracite regions. The other factors that govern the cost of producing coal have changed materially in the past five years, and at present, from an engineering standpoint, matters are in a transitional stage, and there is a most striking mixture of the new and the old. Of course, along certain lines, there has been little advance, because little is possible. This applies particularly to the laying out of a mine and the actual getting of the coal from the breast to the mine-car. It is said to be a boast of the Philadelphia & Reading that it has not changed its general methods of extracting coal in 40 years. Such a boast does not imply a hide-bound conservatism, but simply that, taking all factors into consideration, the methods worked out in the early days were sound. There is more care given to details now, that is about all.

In other particulars there have been greater advances made in the past five years than were made in the previous twenty. Some of these advances were along old directions, others along new. To illustrate, the movement of coal in the main haulage ways, once done by mules altogether, and later by wire rope, is now being done more and more, where conditions will permit, by compressed air and electric locomotives. Even in the Schuylkill region, where mules are used most largely because of the lay of the coal, electricity is being introduced. An advance of this sort may be said to be in old directions. An advance in a new direction is the attention now given to economizing fuel. In the old days, with no market for the small sizes of coal, the operator gave little attention to the wasteful use of what he could not sell, and the 32-ft. cylinder boiler was for many years the source of power at nearly all collieries. In fact, one large company had begun to replace them by boilers of higher power only within five years. The fuel used now is generally the cheapest grade of the small sizes, rice or barley. In a number of cases, however, an unsalable product, jig refuse, a mixture of impure coal in several small sizes, is used. With greater attention to cheaper fuel and better boilers, greater care is given to the insulation of steam lines. The losses by condensation at many old surface plants were disregarded, and, consequently, were very great. Now, such care is given insulation, that a steam line several thousand feet long is not uncommon. In one case steam is carried to a fan engine through a 4-in. line over 6,000 ft. long.

In the preparation of coal at the breaker the losses, though often great, are growing less, as more attention is given to their prevention. Rolls break the coal with less dust than formerly, and, though decreased demand for the larger prepared sizes necessitates more crushing, the loss from this source is probably more than offset by the possibility of selling a great quantity of small sizes, that once went to the culm pile. In the separation of coal and slate, mechanical pickers have been tried, and in some cases give excellent results. They handle both wet and dry coal. Jigs are in extensive use, and the results obtained in separation are encouraging. There is good reason to believe that a jig better adapted to the material to be handled and breakers constructed in the light of the results obtained by rolls, screens and jigs, in handling metalliferous ores, would result in the recovery of a much higher per cent of salable coal than is now the average with most operators.

The above observations merely apply to what one would note in a hasty trip through the anthracite regions, after a five years' absence. There is much work being done, however, that does not show. The long reign of rule-of-thumb practice and guess-work as to various details is slowly ending. The tabulation of results obtained from careful tests made over a considerable period of time, the scientific basis of real advance, is now carried out in more than one office. Details of construction in ventilating fans and in pumping machinery are receiving attention, and models that have been followed for years will be rejected before long, by even the most conservative operators. The men who are doing the careful work are known to their fellow engineers, if not to the world at large.

Anthracite operators have been, as a rule, slow to adopt electricity for pumping and underground haulage, and one company, the Delaware, Lackawanna & Western, has led the way in the applications of electricity. Yet it would surprise some western miners to know that electric drills are being given a more thorough trial in the district about Scranton than anywhere else in this country. In some cases the results obtained have been, to say the least, remarkable for speed and economy. The company that has done the most with electricity is soon to erect an automatic electric hoist for handling water that will, if successful, mark a distinctive advance in mine drainage. The idea is daring, the plans contain novel features and the plant is bound to receive wide notice. Nothing like it has been attempted elsewhere.

It is this mixture of old and new, of practice based on rule of thumb and on scientific deductions, that makes the anthracite region attractive to the visiting engineer. Coal will be mined there for a hundred years and more, but the companies are already compelled to be careful where they were once careless, and forced economy is very often the mother of such progress.

Platinum was discovered in the auriferous sands of the Rio Tinto, Colombia, in 1735, and the Spanish miners gave the metal its present name owing to its physical resemblance to silver.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

MESH *vs.* APERTURE.

The Editor:

Sir.—For the benefit of Mr. Henry W. Edwards, of Grand Junction, Colorado, I ask space to point out that my article on the above subject dealt with the size of screen apertures somewhat from a scientific point of view. Screen capacity, the commercial side of the subject, I did not consider. While capacity is an important function of a screen, it is not the one I discussed. I wrote on the size of screen aperture, not on the number of apertures per square inch, or the relative area of aperture to metal. I claimed screen aperture to be of the first importance in describing milling operations, "as it governs the size of the particles of crushed ore." My final request to the profession, "to report milling operations on the basis of screen aperture expressed in millimeters or decimals of an inch, and to discontinue the use of the word mesh as a supposed measure of size," shows very clearly the nature and purpose of my communication.

These quotations given by Mr. Edwards are incorrect, because incomplete. For instance, I stated "if the term mesh is dropped, then one need only stipulate the size of aperture, thus: 100 ft. of steel wire cloth 30 in. wide, 0.035 in. aperture." Here Mr. Edwards overlooked the continuation of the paragraph: "If some particular wire was found to give the best result in any given case, then, of course, the number of that wire should be added." It might be either No. 29 or No. 34 wire, as pointed out by Mr. Edwards, or even some of the other numbers giving approximately the same opening; and I have known cases where the coarser wire gave the better commercial result; but this matter is quite apart from the point under discussion. When the wire is specified, our order might read 100 ft. of steel wire cloth 30 in. wide, No. 29 wire 0.035 in. aperture, or with equal clearness we could state 0.035 in. aperture, 20 per inch. The word mesh is not in any case necessary.

The leading makers of steel wire cloth weave it very close to normal conditions. The variations from the calculated size of aperture are less than the difference in wear, in comparing a new mill screen with one worn down near the point of rejection; but these are niceties which, for the present, I will not enter into.

It appears to me that the attempt of Mr. Edwards to discover in my letter an aperture large enough for a pitfall has not attained the measure of success that should rightly reward so diligent an effort.

PHILIP ARGALL.

Denver, Colo., Nov. 23, 1903.

CYANIDE PRACTICE AT THE YMIR.

The Editor:

Sir.—Having read with interest, in your issue of November 14, a reprint of Mr. E. C. Holden's paper, 'The Cyanide Plant and Practice at the Ymir Mine, West Kootenay, British Columbia,' I venture to offer a criticism on the writer's method of comparing, experimentally, the two systems of direct and intermediate filling. The comparative experiment on which he bases his conclusion is, in my opinion, hardly a fair one. In testing the direct-filling system, a 32-ft. leaching vat was filled by the inflow from a pointed box. The test on indirect filling was made in a duplicate tank, which was filled from a two-compartment settling box, the sands being alternately discharged from the compartments. "We were thus enabled," says the writer, "to compare the results of the two systems of filling with the same character of material." But, obviously, the same character of material was not used in both tests, since in one case the tank charge was obtained from a pointed box and further settled after leaving the distributors, giving 44.2 per cent fines; in the other, the material came from a two-compartment settler, and gave 39.8 per cent fines.

I take the liberty of suggesting a slight improvement on the method adopted by Mr. Holden. In order to give the two systems an equal chance, let the first tank be directly filled from a classifier by a charge of sand which will admit of a rate of percolation consistent with the best economic results. But the second tank (exemplifying indirect filling), instead of being filled from a separate contrivance, should obtain its charge from the same classifier, so regulated at the water inlet as to admit a larger proportion of slime. In indirect filling, the object is to obtain a barely leachable charge in the settling tank, but one which, on re-shoveling, will give a fair rate of percolation. In the second tank, then, we should have a larger proportion of slime and a considerably lower rate of percolation, a condition perfectly admissible in practice.

The procedure from this point would be as follows: Commence treatment in both tanks simultaneously. In tank No. 1 (direct filling) allow treatment to go on uninterruptedly. From tank No. 2 (intermediate filling), as soon as moisture has been displaced by cyanide solution, shovel the contents to a third tank; or, to simplify matters, shovel out the sand to a platform, and back again to the tank, thus simulating that transposition of the particles of sand which actually takes place in practice. Then level off the charge and continue the percolation, allowing strong solution the same time of contact as in tank No. 1. The logical result of such a comparative test would undoubtedly be a somewhat higher extraction from the intermediate filling method, since (1) the charge would contain a larger proportion of slime; (2) the rate of percolation would be higher, permitting the contact of a larger amount of solution in the allotted time, and (3) the transposition and loosening of the otherwise compact particles by re-shoveling, with the resulting aeration, would obviously improve the extraction. This increased extraction by intermediate filling might be offset by the additional cost of installation and operation, a condition of affairs which would have amply justified Mr. Holden's adoption of the simpler method at the Ymir mine. I do not question the wisdom of the writer's final choice. I am simply pointing out what appears to me an unsoundness in his experimental method, or, rather, in the process by which he reaches his conclusions.

In connection with the same subject, Mr. Holden refutes "the current conception that a much larger proportion of slime can be handled in an intermediately settled charge than in a directly filled one." I think the writer is in error here, and that his error arises from a misconception of the two systems. Mr. Holden's theory, by which he accounts for the greater proportion of slime in a directly filled charge, is, briefly stated, that grains of sand and slime settling under water arrange themselves more compactly with a minimum of voids; while in a re-shoveled charge the voids are a maximum, and the particles of slime coating the sand wash off, settle through the charge, and, by segregating, prevent uniform percolation. Here the writer, quite erroneously, draws a wide distinction between the methods of settling the charge in the two systems; whereas, in large modern plants of both types, precisely the same method is used of settling the sands, namely, by means of distributors; and in both systems the charges are settled under water. In support of this statement I may cite the double-treatment plants of the South African type (intermediate filling) and the plant recently erected by Mr. Merrill at the Homestake (direct filling). In both types of plant the sands are settled under water in circular tanks. Mr. Merrill expressly states, in his recent contribution, 'The Metallurgy of the Homestake Ore,' that he "was determined to avoid double treatment, which entails a largely increased installation and operating cost, *but which is necessary, unless a product be obtained practically free from slime.*" All operators of double-treatment plants recognize the fact that the proportion of slime settled in the collecting tank can be regulated to a nicety by means of the slime-discharge gates; and that this discharge is usually so regulated in practice as to give a product barely leachable in the settler. It is even possible to admit a proportion of slime, which will render the charge impermeable.

I hardly think that this peculiar and long-recognized advantage of intermediate filling (that it permits of the handling of a larger proportion of slime) has been successfully controverted by Mr. Holden, although I admit that in many instances where complex factors must be considered, as at the Homestake, the direct filling method is the only possible one.

F. L. BOSQUI.

San Francisco, Nov. 23, 1903.

CARD SYSTEMS FOR MINE ACCOUNTS.

The Editor:

Sir.—I, for one, should be most interested in knowing further Mr. Comstock's methods of adapting card systems to mine accounts and records. For several years we have used at the Standard mine, at Bodie, such a system for storehouse accounts, and with satisfactory results. It is simple, elastic, accurate, and by no means laborious. In this system, each card shows the details for a single class of article that is carried; the cost and freight and quantity for each shipment are entered from the invoices and freight bills, and from the storehouse tags are entered the quantity and value for all issued stores, and the account to which they are to be charged. In this way the cards give us a daily stock-list, or inventory, of the supplies on hand, in addition to recording the distribution of those issued. The tags are practically 'cards,' but, for convenience of filing, they are of paper; after entry they are inserted in canvas covers, with binding posts, where they are readily accessible for reference. The full advantage of any such system is only gained when entries are promptly made, but once that habit has been acquired by those responsible for the record, things move easily, and with scarcely the possibility of an error.

In another smaller mine, where the accountant has other duties on his hands, certain men—one at the mill, one at the mine, and one on the surface—are made responsible for turning in storehouse tags daily, giving the disposition of any supplies used. A separate tag is given for each item. Every evening these are sorted, according to article, and placed, with their proper cards, in the storehouse set, to be entered up, when the clerk has leisure. It is the superintendent's duty to see that these do not accumulate. As fast as they are entered, they are re-sorted according to account to be debited, and put with a set of cards covering the various accounts—the proper tag with the proper cards. These, again, are entered in summary, and the tags filed for future reference, if necessary. This, with very little work, allows of any article being traced back and responsibility for its disposition fixed.

Returning to our practice at the Standard mine: For mill and mine records we have adopted the 'loose leaf' system, having most of the advantages of the card system, and being less bulky for large sheets. The loose sheets are held in canvas binders, and entries are made on them from the various foremen's reports, which are themselves filed away for a certain time, after the method of the storehouse tags.

The loose leaf system is also used for the regular accounts, with the advantage, over ordinary books, that the accounts can be readily grouped and leaves added as any account grows, and in this way books of unnecessary size avoided.

The advantages of each of these systems are three:

1. There is no limit to their elasticity.

2. They are self-indexing, any card being inserted in its proper place instantly.

3. They are self-renewing, used-up cards or sheets being easily filed away, and yet always available for

reference in their respective cases, while the case for current business is always up to date.

R. GILMAN BROWN.

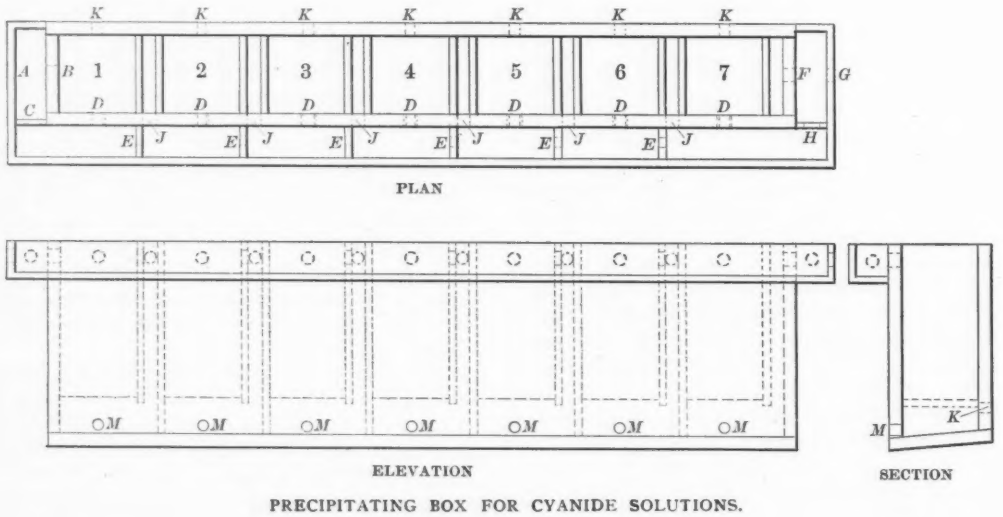
San Francisco, Cal., Nov. 23, 1903.

PRECIPITATION FROM CYANIDE SOLUTIONS.

The Editor:

Sir.—In working with zinc shavings for precipitating gold and silver from solutions of potassium cyanide, I have found it a great disadvantage, when cleaning up, to be obliged to cut off the entire flow of solution in the box, thus leaving it idle for several hours, when probably only one or two compartments needed to be cleaned. Besides the waste of time, it is a decided disadvantage to have to cut off the flow of solution, when one has it regulated to a fine point. For these reasons, I have been led to design a box, shown in the accompanying print, which will obviate this inconvenience by making it possible to cut out and clean any one or a number of compartments, without changing the flow of solution or interfering with the compartments, other than those in the process of cleaning.

It is possible that this may not be so necessary or as useful in working with gold ores, where the bulk of precipitate is not great; but with silver, which is now occupying a prominent place in the eyes of the progressive metallurgist, it will be found advantageous. In this case, the bulk of the precipitate is great, and it becomes necessary to clean one or two compartments of the box daily, when it will be found convenient to be able to do so, without obliging the rest of the box to remain idle. Moreover, the flow of solution, once regulated, need not be changed.



PLAN

ELEVATION SECTION

PRECIPITATING BOX FOR CYANIDE SOLUTIONS.

The box shown contains another innovation, in that the flow of solution through the zinc-piles is down, instead of up, as is seen in the usual zinc-box. It appears to me that this is an improvement, in that it assists the settling of any detached particles of precipitate, which in the upward-flowing solution might be carried to the top and over into the next compartment. The downward flow should induce settlement at the earliest possible moment, which is an end to be attained. However, should anyone still consider the upward flow an advantage, the box may be turned end for end and used in the usual way.

The body of the box is made of 2-in. lumber, the baffle-boards and launder of 1-in. stuff. The compartments are 1 ft. square and 2 ft. deep to the screen. The space below the screen is 6 in. on one side and 5 in. on the other, the bottom having an inclination of 1 in. to facilitate the cleaning out of the precipitated slime. The holes *A, B, C, D, E, F, G* and *H* are 2 in. in diameter and are to be fitted with carefully turned plugs about 1.5 in. long and slightly tapered. The row of holes *K*, one in each compartment, are 1.5 in. in diameter, fitted with plugs, and are intended to be used in draining off the clear liquid after settling. The holes *M*, also 1.5 in. in diameter, are for washing out the precipitate with a stream of water into a launder, which may be conveniently placed along the lower side of the box.

The solution to be precipitated enters through the hole *A* into the launder and thence through the hole *B* into compartment 1, rising between the baffle-boards and flowing out through the hole *J* in the first compartment, the holes *C, D* and *E* in the first compartment being stoppered. It then enters compartment 2 through the hole *D* in that compartment, flowing down through the zinc-pile, up between the baffle-boards and out through its hole *J*, continuing thus through the box. When all the compartments are in use all the holes *E* are stoppered and all the holes *J* and *D* are open, except *D* in the first compartment.

Should it be required to cut out the first compartment for cleaning, the hole *B* is closed and *C* opened, at the same time the first *J* is closed and the first *E* opened. The solution then enters the launder, flows through *C* and *E* and enters compartment 2 by its hole *D*, thence continuing through the box as usual. Should it be required to cut out the second compartment, the solution is allowed to enter the first compartment as usual and enter the launder through its hole *J*. The hole *D* in No. 2 is closed, the second *E* opened and second *J* closed, so that the solution passes through *E*, entering No. 3 through its hole *D*, leaving No. 2 cut entirely out of the circuit. The zinc may then be shaken and removed, the screen trays lifted, solution allowed to settle, decanted through *K*, and finally the settled precipitate washed out through *M* with a stream of water into the launder, leading to the sump or filter-press. In the same way any other compartment of the box may be cut out and cleaned, without disturbing the flow of the solution.

If it should be considered desirable to have the solution flow upward through the zinc-piles, the box can be turned end for end, the solution entering through *G* and *F* into the box, flowing down between the baffle-boards and up through the zinc-pile, flowing out through *D* and entering the next compartment through *J*, and so on through the box.

The dimensions given are for a small box, and are intended to be varied to suit the occasion, the object being only to illustrate the principle of the system. It will probably be found that, with boxes of this design, a less number can be used and of greater size, as the cutting out of one compartment will hardly be noticed in a large box. The precipitating capacity will not be lessened to any appreciable extent.

There is no patent on the idea, and if any metallurgist should find it a convenience in his plant, the writer would feel amply rewarded for the exposition of his idea.

HERBERT A. MEGRAW.

Copala, Sinaloa, Mexico, Oct. 31, 1903.

DETERMINATION OF GOLD AND SILVER IN CYANIDE SOLUTIONS.

The Editor:

Sir.—Those who have occasion to assay cyanide solutions, in order to determine the amount of gold, silver, etc., in solution will find that the following method will greatly facilitate their operations:

Draw off 100 to 500 c. c. of the cyanide solution. Place some sawdust or porous cotton in an iron pan or any convenient iron vessel. Pour the solution gradually upon the sawdust and allow it some time to be absorbed by the latter. Apply heat gradually to the iron vessel until all the solution is evaporated and the sawdust reduced to carbon. The residue, mixed with the proper fluxes, is transferred into a crucible and then assayed in the ordinary way. Should the volume be too large it can be quartered down. Should it be desirable to make an estimation for the base metals, the same can be made volumetrically or gravimetrically, with the precaution of washing the carbon with distilled water.

This simple method of absorbing the cyanide solution offers the advantage of being rapid and enables the operator to treat a larger volume of solution, which is important, as the percentage of gold in a small solution is in most cases so minute that it can only be found as a trace, which renders the assay practically valueless, so far as quantitative determination is concerned, because this trace of gold could only be calculated by redissolving the gold in *aqua regia* and applying the sensitive Cassius color test, with which not all assayers in this country are familiar.

The above described method is not claimed as a scientific discovery, but it may be appreciated by practical cyanide operators in America.

ROBERT GRAUER.

Portland, Oregon, Nov. 12, 1903.

Erratum.—In the article on 'Raw Sulphide Smelting,' by Dr. F. R. Carpenter, which was published in the JOURNAL for November 7, on page 688, in the small table in the third column, giving the composition on slags, in the second line $CaCO_3$ should have been CaO. The error was self-evident, and we think most of our readers will understand it; but we make the correction here at the request of the author.—EDITOR.

THE MINERAL RESOURCES OF INDO-CHINA.

A recent report, prepared under the direction of the local government of Indo-China, gives some interesting information regarding the status of the mining industry in that colony. In Tonkin, the most valuable resources under exploitation are the coal mines at Quang-Yen, where a French company is operating with much success. The output of this company in 1902 was about 317,000 tons of coal. There is a smaller mine in the same locality operated by Chinese, and two small mines in the Province of Hainduong. In addition to coal, there are two iron mines in Thai-Nguyen and Phu-Lien, and an antimony mine at Quang-Yen. Permits have been granted recently for the exploitation of other minerals, including gold, silver, lead, copper and zinc, but as yet none of the undertakings have reached the productive stage.

In Annam the coal mines of Nong-Son employ about 700 coolies, and turn out about 100 tons a day. At the gold mines at Bong-Miu, a cyanide plant has recently been installed, and it is expected that operations will be carried on steadily in the future. The concentrates from the ore are said to yield about 70 gm. gold and 44 gm. silver per ton.

In Laos a French company is exploring tin mines at Pakhin-Boun, and has met with such success that it is preparing to add to its plant, the intention being to smelt and refine the tin at the mine. There has been much activity recently in exploration for gold, and three mining concessions have been granted to French companies.

THE GEOLOGICAL SURVEY AND THE BUTTE LITIGATION.

We publish, by request, the following letters, bearing on the question at issue between the United States Geological Survey and the Montana Ore Purchasing Company, as to the publication of advance abstracts of the report on the geology of the Butte district:

Montana Ore Purchasing Company.

May 5, 1903.

Hon. Charles D. Walcott, Director, United States Geological Survey, Washington, D. C.:

My Dear Sir.—I beg to hand you herewith a copy of a letter written in May, 1900, to our superintendent, Mr. George H. Robinson. It appears from this that there has been some carelessness or misunderstanding on the part of the Geological Survey, or Mr. Weed, in that he has forwarded his report to the publication office and made an abstract for publication in the ENGINEERING AND MINING JOURNAL of April 18, 1903.

I would respectfully beg to call your attention to this, and to request that until the litigation now pending is settled, this publication be withheld. Yours very truly, F. AUG. HEINZE.

Department of the Interior.

United States Geological Survey.

Washington, D. C., May 12, 1903.

Mr. F. Aug. Heinze, Montana Ore Purchasing Company, Butte, Montana:

Dear Sir.—In reply to your letter of May 5, I would say that you are under a misapprehension as to Mr. Weed's report upon Butte. It is not completed and has not yet been submitted for publication. The article in the ENGINEERING AND MINING JOURNAL (April 18) referred to, is only one of a series of reports of the geologists of the survey engaged in economic work, giving a brief statement of the present condition of their work and the general results so far arrived at by them. This has appeared as *Bulletin No.* 213 of the Survey publications, of which a copy has already been sent you, and by reference to which you will see that the JOURNAL publications contain all that appears in the bulletin.

I would be glad to be informed, however, what litigation is now pending that is liable to be influenced by the publication of the final report on Butte, and in what respect the observations of Mr. Weed on the properties under your control are liable to influence that litigation, as it is expected that his report will be completed within the coming year, and, in view of our duties toward the public, it will not be possible to withhold its publication indefinitely. Very respectfully, CHARLES D. WALCOTT, Director.

Montana Ore Purchasing Company.

May 25, 1903.

Hon. C. D. Walcott, Director, U. S. Geological Survey, Washington, D. C.:

My Dear Sir.—In reply to your letter of May 12, I would beg to state that, while Mr. Weed's report in *Bulletin No.* 213 may be an abstract only of the Butte report, it covers in considerable detail some of the points in contention in one of my Butte properties in much more detail, proportionally, than is given to other geological questions involved in the Butte district.

In reply to your query about pending litigation that may be influenced by the immediate publication of the official report of the geological survey, I would say that at least four of my principal properties are involved in litigation, which in greater or less degree might be affected by such publication.

Between the Rarus-Johnstown and the Michael Davitt the questions now settled by the Supreme Court of the State of Montana in the Pennsylvania case have yet to be adjudicated, though I have twice won this case. This, because the United States judge has on each occasion allowed my opponents a new trial.

There is a vital controversy involving the extralateral rights of the Minnie Healey. In the Corra, Rock Island and the Nipper properties questions of the rights within and without the property lines are involved, as a result of which the Nipper mine is not now in operation.

All of these properties involve questions that must of necessity be covered by Mr. Weed's report. If the report is published, it will be used in court, and will be subject to severe adverse criticism and the question of fairness and accuracy, which I judge will not be beneficial to the good name of the United States Geological Survey and its supposed freedom from "undue influence."

As to the duty you are supposed to owe to the public, it occurs to me that this was subordinated to Mr. Weed's desire to enter my mines, at the time of his letter, and various intercessions, whether had directly with my or through my corps of engineers. This is manifest from the fact that his written promise makes no mention of "duty to the public," but agrees absolutely to the withholding of all publications relating to Butte, pending litigation. I shall hold the United State Geological Survey, Mr. Walcott and Mr. Weed absolutely to this agreement. Yours very truly,

F. AUG. HEINZE.

Department of the Interior.

United States Geological Survey.

Washington, D. C., Nov. 18, 1903.

Mr. F. Augustus Heinze, Butte, Montana:

Sir.—In reply to your letter of May 25, and to the remarks made in court by your employee, Mr. G. H. Robinson, and subsequently distributed widely in pamphlet form, which substantially accuse Mr. W. H. Weed, and, through him, the Survey, of violation of an agreement contained in my telegram of May 3, 1900, as to the publication of the Butte report, I beg to say that I have carefully considered all the facts in the case, and cannot find that we have in any way departed from our understanding of that agreement.

The trials referred to in the telegram as *present litigation* had been closed long before the publication of the article on Butte veins contained in Survey *Bulletin No.* 213, to which exception has been taken by you. This is not the Butte report referred to in the telegram, which is not yet written, but a brief statement of general geological structure of the Butte veins, and gives no specific facts as to individual mines. Furthermore, this general structure was substantially determined before any agreement was made. and the Rarus fault had already been recognized and mapped in the Butte folio published in 1897; hence the agreement could not apply to them, except retroactively.

It is the long-established practice of the Survey, while examining a mining district, to carefully avoid making any statements with regard to mines under litigation that may influence that litigation, and, where so requested by the owner, to abstain from publishing facts observed in his mine while examining it under his authorization; but it is well understood by all concerned that this does not preclude the Survey from publishing conclusions with regard to the general geological structure of the district, which must necessarily be derived from a consideration of the facts disclosed in all the mines of the district, including those under litigation.

It is these general conclusions that constitute, for the mining public, the main value of the Survey reports, and to refrain from publishing them as long as any litigation exists in the district would, in most cases, preclude the Survey from making any economic report whatever.

The application of these conclusions to particular mines is to be made by experts employed by those mines, and, as stated in the article referred to, the geological interpretation of observed phenomena does not necessarily coincide with that placed upon them in the courts from the point of view of the United States mining law, as was proved in the case in which your employee saw fit to make a personal attack upon the good faith of a member of this Survey.

The reiteration, in that pamphlet, of old stock exchange rumors, attributing interested motives to members of this Survey in drawing their scientific deductions as to Butte veins, in which your people have expressed their disbelief, and which were long ago declared unfounded, was too evidently made for the purpose of temporarily influencing public opinion to be worthy of further notice. In such cases, which are simply the differing opinions or beliefs of two parties, the public will necessarily give credence to the one whom previous reputation for integrity has rendered the more worthy of it, and to such a judgment the Survey is quite willing to submit.

Very respectfully,

CHARLES D. WALCOTT,
Director.

GOLD DREDGING IN VICTORIA.

The report of the Secretary for Mines and Water Supply of Victoria, relating to the year 1902, contains a review of the gold dredging industry in that State, from which the following abstract has been prepared:

The dredging operations are classified as bucket dredging, pump hydraulic sluicing and jet pumping. There are 45 plants in all, besides two in course of construction. During 1902 ten bucket dredges were operated for an aggregate period of 295 weeks, raising 1,848,877 cu. yd. material for a yield of 6,584 oz gold, or 1.7 grains per cubic yard. The average weekly return per dredge was 22.3 oz. One dredge working 48 weeks recovered 1,163 oz. The pump hydraulic sluices, 19 in all, worked an aggregate of 610 weeks and recovered 23,433 oz. gold from 4,856,919 cu. yd. material, or 2.3 grains per cu. yd. The average weekly return per plant was 38.4 oz. The two hydraulic jet elevators, each working 20 weeks, handled 50,820 cu. yd. material for a yield of 540 oz. gold, or 5.1 grains per cu. yd. The weekly return per plant was 13.5 oz. gold. The total quantity of material treated under the heading of dredge mining and hydraulic sluicing by gravitation was 6,911,697 cu. yd., which yielded 33,109 oz. gold, as against a total recovery of 30,874 oz. from similar operations in 1901. This increase may be regarded as very satisfactory, in view of the small rainfall, and consequent insufficient supply of water.

During the year a beginning was made in working old tailings dumps and debris from former operations. The method adopted is known as dry-land dredging, and consists, briefly, in elevating the material into a revolving screen, where it is classified, the coarser material being conveyed by chutes to the refuse heap. The finer material from the classifier passes into a second screen, revolving in water, where most of the gold is caught, and the residual is passed over blanket-tables, which save the smaller particles of gold, together with the black sand.

The capital invested in the dredging industry in Victoria exceeds £270,000. In the three years, 1900, 1901 and 1902, the gold recovery amounted to 80,912 oz., valued at £323,648, and an average of 973 laborers were employed. The results have shown that with seasons of average rainfall, with proper machinery and good management, gold dredging in Victoria is remunerative, and fairly reliable as a dividend-paying enterprise.

UNITED STATES CENSUS REPORTS OF MINERAL PRODUCTS.—The Bureau of the Census at Washington makes public the following statistics, covering the production and value of some of the minor minerals in the United States in 1902: Corundum and emery, 4,251 short tons, $104,605; garnet, 3,926 short tons, $132,820; infusorial earth, tripoli and pumice, 6,240 short tons, $54,558; marl, 12,439 short tons, $12,741; buhrstones and millstones, $59,808; crystalline quartz, $43,085; grindstones and pulpstones, $667,431; oilstones and whetstones, $113,968; asbestos, 2,505 short tons, $46,200; barytes, 58,269 short tons, $193,884; bauxite, 29,222 long tons, $128,206; borax, 43,010 short tons, $2,383,614; sulphur and pyrites, 207,874 long tons, $947,089, in value.

CALIFORNIA STATE MINERS' ASSOCIATION.

BY OUR SPECIAL CORRESPONDENT.

The opening of the annual meeting was reported in our news columns last week. At the close of the report, the convention was still in session, and, as its conclusions have a bearing of some importance on the mining industry of the State, an account of the last day's session is given below:

Possibly the most important resolution adopted was that which created the most discussion and brought out rather a heated argument, relating, as it did, to the much-discussed debris question or the continuance of hydraulic mining. The resolution finally adopted was as follows:

"WHEREAS, The United States Debris Commission, having Congressional authority to determine what hydraulic mines in the drainage basins of the Sacramento and San Joaquin rivers may legally conduct that form of mining, having in a written communication to this association stated that there has been no considerable failure of any of the impounding barriers; but few cases of illegal mining discovered; the number of failures of dams comparatively small; and that no large percentage of debris has escaped by reason of failures of impounding works, and

"WHEREAS, The Federal Commission in charge of such work has the best facilities for knowing the practical workings of the laws relating to hydraulic mining; therefore be it

"*Resolved*, That this association deprecates the numerous and frequent attempts of the Anti-Debris Association—a private organization without either Government or State sanction or authority—to interfere with individual mines and miners and obstruct as far as lies in their power the workings of the law permitting hydraulic mining in the section referred to by serving injunctions and otherwise annoying miners who have already received Federal licenses to mine by the hydraulic process."

This very mild and truthful resolution brought out a strong opposition from certain representatives of those opposed to hydraulic mining, but the resolution was adopted by a large majority. It was contended by their attorneys that the anti-debris men had a right to bring injunction suits in local courts, while the miners are firm in the belief that, after once obtaining a license from the Federal commission, they have a right to go ahead without molestation. They have nothing whatever to do with State courts. The miners obtained their ground by purchase from the Federal Government; have to obtain license to mine it from the Federal Government; have to relinquish all their rights to control their land by executing an instrument when applying for a license, surrendering to the United States the right to regulate the manner in which resultant debris shall be restrained, and what amount may be produced from the mine; have to construct and pay for the impounding works under plans and supervision of Federal engineers; and are only allowed to work the mines by the hydraulic process so long as the Federal commission is convinced that no damage is done to navigable rivers or the lands of other people. Being thus compelled, whether they will or no, to come before the California Debris Commission especially appointed by Congress and the President of the United States, both for licenses and the right to continue mining, they desire that the Anti-Debris Association, or any individual having objections, shall come before the same tribunal, or the Federal Courts, instead of resorting to courts whose judges are elected in well-known anti-debris communities.

This, in brief, is the argument of the miners on this important question. At present, capital will not invest in this branch of mining, for fear of injunctions, or suits, to be heard before local courts instead of the Commission or the Federal courts. The Anti-Debris Association has passed resolutions, insisting on greater vigilance in the matter of hydraulic mining, and the miners are resolved to renew the old fight if necessary.

The Miners' Association also recommended Congress to appropriate the sum of $500,000 to be spent under supervision of the California Debris Commission for constructing impounding dams, or other restraining works, on several streams and tributaries of the Sacramento and San Joaquin river systems as outlined in the recommendations contained in executive document No. 267, 51st Congress, second session. This document contains the recommendations of the California Debris Commission. The State of California is urged to appropriate a like amount for the same purpose, at the same places.

The Committee on Department of Mines and Mining, after preambles showing how futile had been the attempts to have this department established, resolved to ask Congress to appoint a separate and special Commissioner of Mines and Mining whose work shall be done on the lines of that of the Director of the United States Geological Survey, but to include under his jurisdiction gold and silver, as well as all other mineral substances produced in this country; said commissioner to be under such cabinet officer as Congress may deem best.

As the lapse of time frequently renders it difficult, and sometimes impossible, to prove with certainty the date of a mining location upon which a mineral patent has been issued, thus giving rise to vexatious and expensive litigation, the following resolution was adopted:

"*Resolved*, That in the opinion of the California Miners' Association, all patents for mineral land, hereafter issued, should contain a statement of the date of location of the claim, upon which issuance of said patent is based, and such statement should be *prima facie* evidence of the date of such location in both Federal and State courts."

In connection with the recent frequent labor disputes in the mining regions the association passed a resolution offering its aid in the settlement of such disputes, and agreed, whenever requested to do so, to have the president appoint a committee to arbitrate any such differences.

It was also agreed that the association and its members lend aid to put a stop to 'wild-cat' mining schemes in California.

At the closing session of the association the following officers were elected: C. M. Belshaw, president; Harry P. Stow, vice-president; E. H. Benjamin, secretary; Samuel J. Hendy, treasurer. The new executive committee consists of these officers, and, in addition, J. H. Neff, W. C. Ralston, E. C. Voorheis, Charles G. Yale, C. H. Dunton and W. H. Osborne. Two members for each mining company are to act as advisory committee. The old executive committee consisted of 120 members, but it is now much smaller, and is expected to be more effective for that reason. The report of the session, with all the technical papers read, is now in the hands of the printer.

DELPRAT'S METHOD FOR SEPARATING MIXED SULPHIDE ORES.

G. D. Delprat, general manager of the Broken Hill Proprietary Company, has patented the process of separating mixed sulphide ores, which consists in feeding finely ground ore into a bath containing dilute nitric acid, whereby gas-bubbles are formed on the ore particles, raising them to the surface of the solution, whence they can be removed. The process is carried out at ordinary temperatures. The operation depends upon the ore-particles being attacked by the acid to form a gas. Each particle of ore, as attacked, will have a bubble, or bubbles, of gas adhering to it, by means of which it will be raised and can then be skimmed or floated off the solution. To facilitate the floating of the ore-particles, suitable salts are added to the solution to increase its specific gravity. The gravity of the solution is increased to about 1.4 by the addition of a suitable nitrate, such as sodium nitrate or zinc nitrate. The operation is performed in an apparatus which is so designed that the gangue unacted upon by the acid will slide down into a sump, whence it may be discharged by any suitable arrangement, while the metallic scum, rising to the surface, passes off through an overflow trough.

SHAFT SINKING IN SOUTHEASTERN MISSOURI.

The No. 2 shaft of the St. Louis Smelting & Refining Company was sunk to a depth of 407 ft. in eight months, in spite of a flow of water averaging 450 gal. per minute. This shaft is 6 ft. by 18 ft. in the clear. The No. 4 shaft of the same company, which is 8 ft. by 20 ft., was sunk to a depth of 338 ft. in five months. The No. 2 shaft of the Federal Lead Company, 10 ft. by 20 ft., was sunk to a depth of 418 ft. in six months. There was no water in this shaft. The No. 4 shaft of the Desloge Consolidated Lead Company, 7 ft. by 20 ft., which was also free from water, was sunk 320 ft. in four months. The No. 5 shaft of the Doe Run Lead Company, 6 ft. by 14 ft., was sunk 400 ft. in four months, and in this shaft there was water to contend with. In one month 116 ft. were sunk. This is claimed to be the best on record in the district. The rock through which these shafts are sunk is a hard, magnesian limestone. No timbering is done, except the stulls to support the cage guides, pipe lines, and other necessary work.

COAL MINING IN SIBERIA.—According to a Russian contemporary, there are five coal-fields in Siberia under exploitation; these are Irkutsk, Sudzenkovo, Ekibaztuz, Sakhalin and the eastern coast district. The Irkutsk field in 1900 supplied about 165,000 tons of coal to the Siberian Railroad. In addition to the fields enumerated, the basin of Kuzuetski is known to contain rich coal-seams, but its development will be delayed until there are better facilities for transport.

NEW IRON ORE DEPOSITS IN GERMANY.—It is reported that deposits of clay iron-stone have been found in the lower Rhine district, a short distance north of Wesel. Drilling operations have been carried on in the vicinity for some time, for the purpose of exploring for coal and salt deposits. The body of iron ore is interbedded in Liassic strata at a depth of about 470 m. Where intersected by the drill, it had a thickness of 10 m. Its discovery has led to much activity in exploratory operations, and 20 drills are now at work to test thoroughly the character and size of the deposits.

A REMARKABLE AERIAL TRAMWAY.—A wire-rope tramway, now under construction in Argentina, claims attention, both on account of its length and the great difference in altitude between the terminals. It is to be used for the transport of ores from the mining district of Mexicana, in the Andean Cordilleras, to the station of Chilecito, on the North Argentina Railroad. With a length of 35 km. (22 miles), it reaches an extreme altitude of 14,000 ft. above sea-level, making a rise of about 11,500 ft. in the distance mentioned. The country traversed is extremely broken, which necessitates, in places, very long spans between towers, as well as unusual elevations of the cable. The longest span is 2,765 ft., and in crossing one valley the cable swings 625 ft. above the ground. As the entire installation, including cables, towers, boilers and engines, has to be transported from the nearest railroad station by pack-animals, the heavier parts are made in sections of convenient weight for handling. The total length of cables is 140 km., and the weight of the entire outfit, including some 16,000 parts, is approximately 2,000 metric tons. The tramway is designed to carry 40 tons of ore per hour, with a speed of 2.5 m. per second, the cars being of 500 kg. capacity. Its construction is now well under way, and the first section will soon be in operation. It is built upon the Bleichert system.

THE WISCONSIN ZINC-FIELDS.

By FRANK NICHOLSON.

Mining for zinc in Wisconsin is carried on in the counties of Grant, Iowa and Lafayette, in the southwestern corner of the State. The Geological Survey separates the sedimentary rocks occurring in the lead and zinc district into seven formations, as follows:[1]

Niagara limestone	Silurian (or Upper Silurian).
Hudson river shales, Galena limestone, Trenton limestone, St. Peter sandstone	Ordovician (or Lower Silurian).
Lower magnesian limestone, Potsdam sandstone	Cambrian.

The main ore-bearing formation of the district is the Galena limestone. This limestone is about 250 ft. thick. It is a dolomite and differs materially from the underlying Trenton. The chief geological horizons known to the miner are the 'glass rock,' which belongs to the top of the Trenton, and the 'oil rock.' The oil rock is a compact, very finely laminated, soft shale, which varies in color from a light yellowish gray to a dark chocolate color, the latter being the customary shade. It contains a considerable percentage of carbonaceous matter, and gives off a peculiar petroleum odor when heated. In some cases the percentage of carbonaceous matter is so great that the rock will burn with a smoky flame, especially if it be in very thin sheets.

A matter of considerable interest in regard to the geological features of the zinc district is the fact that Grant, Iowa and Lafayette counties of Wisconsin lie wholly within the driftless area; that is, these counties entirely escaped the deluge of ice that covered the northern States with a layer of unconsolidated material known as the 'glacial drift.' It is generally conceded that the lack of glaciation is chiefly due to the fact that the ice coming from the north and northeast had its main currents deflected by the large valleys of Lake Superior and Lake Michigan, and by the highlands in Wisconsin to the north and northeast of the driftless area. The possibility of local glacial deposits in this district has been noted; but the fact that the district was never covered by moving ice, while the entire surrounding country was thus deeply covered, is one of the most peculiar and striking phenomena in the whole range of glacial history.[2]

Lead appears to have been discovered in this district by Nicholas Perrott about 1692. The first mining was done on the site of the present city of Dubuque by Julienne Dubuque, who obtained from the Indians land, on which lead had been discovered a few years previously. After Dubuque's death, in 1810, little was done until 1820, and before 1830 mining had become quite general in the vicinity of Dubuque and Galena, and also in southwestern Wisconsin; from that time down to the present day mining has been carried on continuously, with certain periods in which the district figured prominently as a producer of lead and zinc. The early work was devoted entirely to the mining of lead, the zinc ores being unrecognized, or, when recognized, regarded as of little value. It was not until about 40 years ago that zinc ores were mined in this region, and the production rapidly increased until the district became more important as a source of zinc than of lead. The zinc, however, mined in this district until very recently has been the carbonate, known locally as 'dry bone' or simply 'bone.'

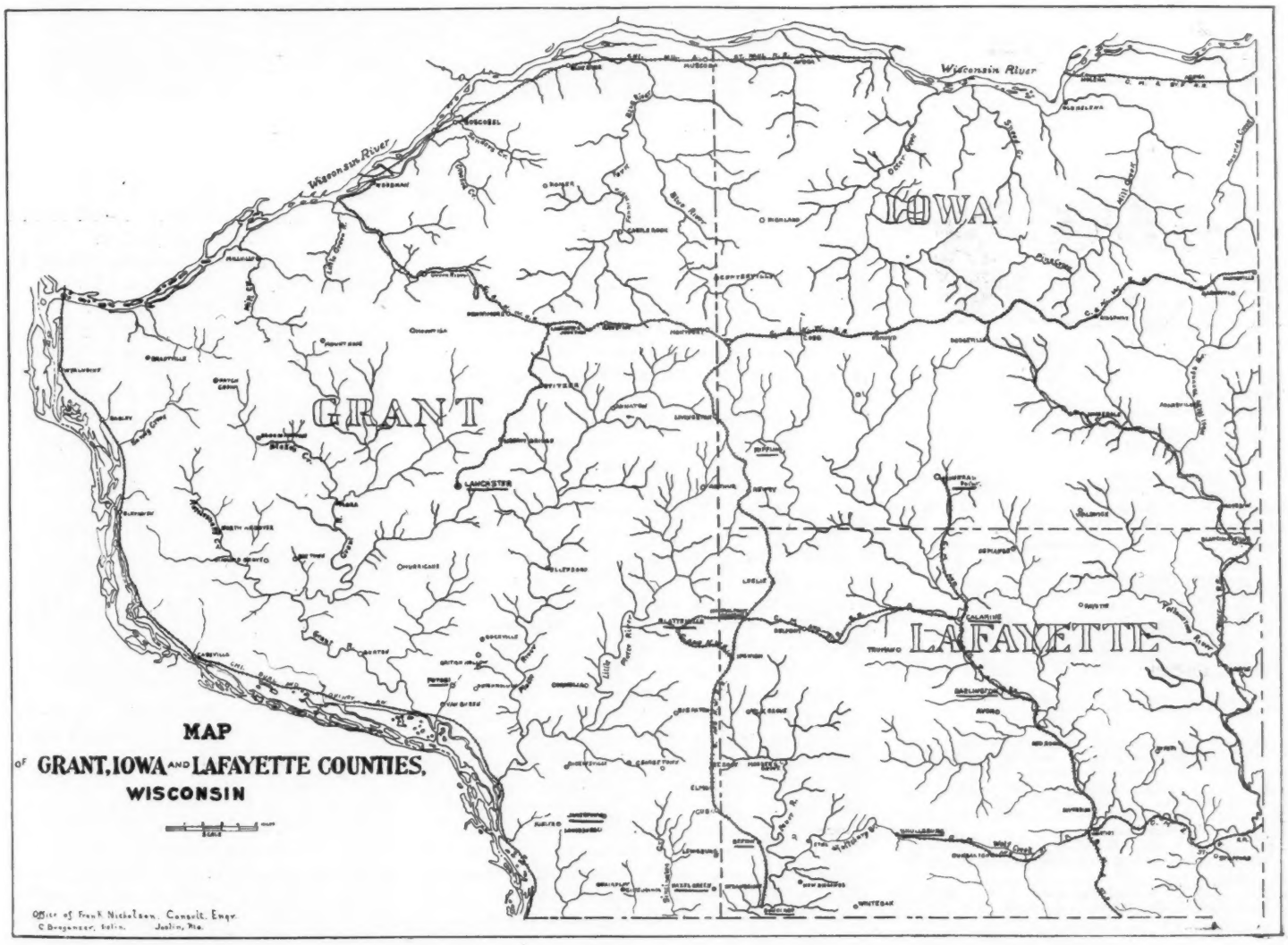
As the general level of ground-water was reached the carbonate was no longer found, but blende was encountered. As the latter locally is associated with about an equal proportion of iron sulphide in the shape of marcasite, it was not salable to the smelters existing at that time at Mineral Point. More recently, the introduction of magnetic separation has made this mixture of iron and zinc sulphides available.

The mode of occurrence of the zinc ores in the Wisconsin district has received some attention from the Wisconsin Geological Survey and other observers, but as yet it is not very clearly understood. The general type of deposit is shown by the sketch on page 849.

Along the horizontal bedding-planes of the limestone there are sheets of blende varying in thickness. This ore-deposition follows down along the vertical jointing-planes. As a rule, at the bottom of the deposit a sheet of blende is found. The great core is thus separated out from the body of the limestone and included within the sheets of blende which form a complete envelope enclosing the disseminated ore. The ore lies in belts having a fairly definite course. These ore-bearing areas are called 'ranges.' Most of the Wisconsin ore-bodies lie in east and west ranges, and therefore have north and south walls. It happens not infrequently that in the core itself are developed secondary sheets of blende almost as important as those along the walls of the deposit.

As in other isolated localities, a peculiar nomenclature has grown up in and about the mines. Pyrite, which in Joplin is known as 'mundic,' is here termed 'sulphur'; and it is not unusual to hear the remarkable statement that the buyers refuse to take the ore unless it be free from sulphur. The meaning is that the buyers insist upon a separation of most of the iron sulphide before considering the ore merchantable. The horizontal sheets of blende are known as 'flats,' while the deposits of ore along the jointing-planes are called 'pitches.'

Perhaps the most curious local terms are the names employed to designate the disseminated ore in the great cores between the pitches and flats. The core itself is termed a 'brangle,' and the ore in this

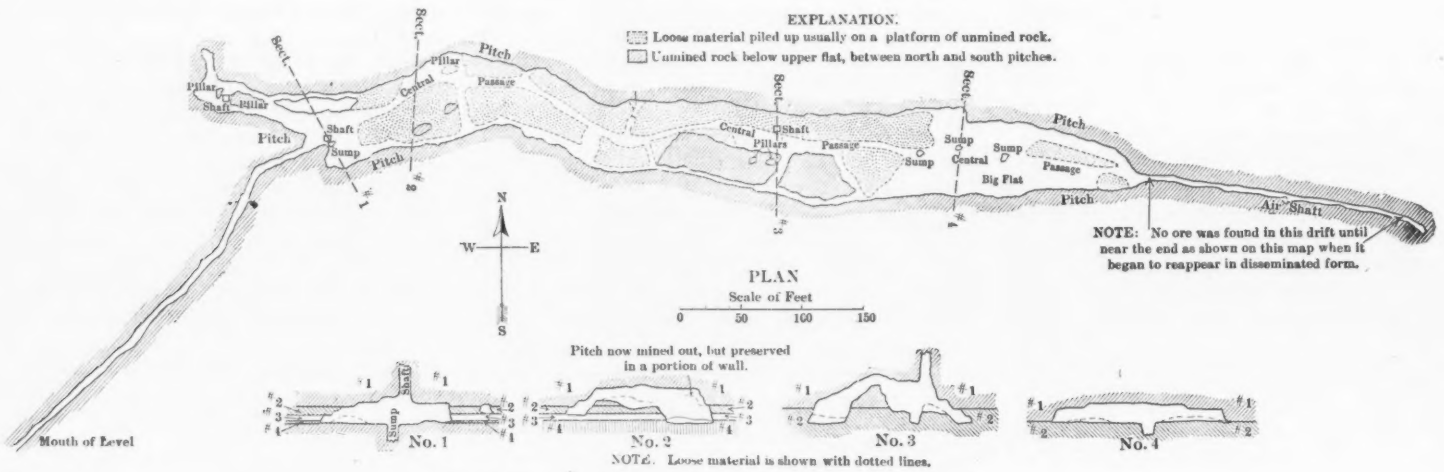


[1] 'Preliminary Report on the Lead and Zinc Deposits of Southwestern Wisconsin,' by Ulysses Sherman Grant, page 21.

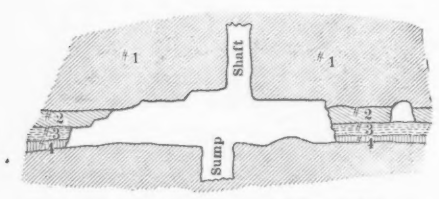
[2] *Opus cit.*, p. 14.

brangle is termed 'random ore,' so that one hears of certain workings being confined to the 'random in the brangle'; and a mine-owner, in showing his property, will point out a 'wee bit of brangle' as well as certain 'pitches' and 'flats.'

In the Hoskin and Kennedy mines, near Hazelgreen, the 'pitches' and 'flats' are beautifully developed. In the Hoskin mine there is one point where, along the pitch, the ore-sheet is 5 ft. thick. The Empress mine, about four miles from Benton, a 40 per cent zinc is comparatively simple, although it is sometimes difficult to keep the iron sulphide tailings below 5 per cent in zinc. This, however, is not a serious condition, as the tonnage of iron sulphide is small in such ores.

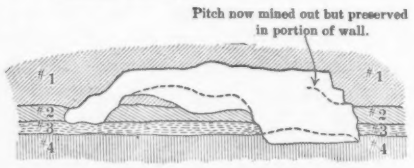


PLAN AND SECTION OF EMPRESS MINE, WISCONSIN.



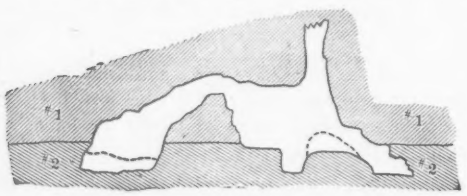
SECTION NO. 1, EMPRESS MINE.

Layers:
No. 1—Limestone, beds 4" to 14", containing thin layers of oie and calcite along bedding-plane.
No. 2—Similar limestone beds, containing decomposed nodules of chert, and also jack and marcasite, in disseminated form and in layers.
No. 3—Fossiliferous limestone, 1" to 5" beds, interstratified with layers of oil rock ¼" to 1" thick.
No. 4—Hard limestone bearing disseminated jack, with occasional thin layers of oil rock.



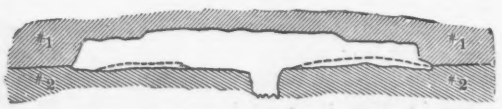
SECTION NO. 2, EMPRESS MINE.

Layers:
No. 1—Thinly bedded limestone, containing seams of jack along bedding-planes and in well-developed pitches, 2" to 8".
No. 2—Lead-ocher colored limestone, chert nodules, filled with disseminated jack, layers of oil rock ¼" to ½". Upper portion dark colored, disseminated jack and marcasite.
No. 3—Soft, thinly bedded limestone, full of disseminated iron sulphide, containing a few seams of jack 1" thick.
No. 4—Thin, unevenly bedded limestone, chert nodules interstratified with layers of oil rock.



SECTION NO. 3, EMPRESS MINE.

Layers:
No. 1—Heavy bedded limestone.
No. 2—Thinly bedded, closely-cemented limestone.



SECTION NO. 4, EMPRESS MINE.

Layers:
No. 1—Limestone, beds 6" to 12", containing thin seams of jack and calcite along bedding-planes; also large amount of calcite in cavities.
No. 2—Thin beds, composed of limestone and flint nodules, containing thin layers of material resembling oil rock.

plan and section of which accompany this article, has been mined out largely, and is therefore one of the most satisfactory mines to inspect, as the shape of the original ore-body is clearly outlined. In this mine the 'flats' and 'pitches' are shown with great distinctness. The 'brangle' also must have been quite rich, as most of it has been removed. The accompanying sketches are from actual survey.

At the Enterprise mine, at Plattsville, flats and pitches are well defined, and resulting concentrates carry only about 10 per cent of iron. No separator is in use at the Enterprise mill, the raw concentrates being marketed direct. On October 13 the Hoskin mill was burned down, together with a magnetic separating plant and the surface equipment generally. This mill will be rebuilt at once.

The mills at the Hoskin and Trego mines were furnished with roasters and the Cleveland-Knowles type of magnetic separators. Work done by these separators has been fairly satisfactory. The raw concentrates assayed about 25 to 30 per cent in metallic zinc and about the same in iron. The finished product assayed from 57 to 61 per cent in metallic zinc and from 2 to 4 per cent metallic iron.

For the past year Mr. A. M. Plumb has been experimenting on Wisconsin ores with a Blake-Morsecker electrical ore-separator. This machine handles from nine to 22 tons of concentrates in 24 hours, depending on the grade of the material handled. Concentrates running 18 per cent zinc will yield about 25.5 per cent of their weight in 59 per cent blende and 74.5 per cent in iron sulphide running 4 per cent zinc. This is supposing that the concentrates do not carry to exceed 7 per cent gangue. It is found that the greater portion of the gangue in Wisconsin ores is carried in the iron sulphide contents, and is thrown out with the sulphide of iron. This gangue consists of a lime-rock heavily impregnated with marcasite. Concentrates carrying 30 per cent metallic zinc yield about 47 per cent of their weight in 59 per cent blende. It is found possible, with a high grade of concentrate, to make a better grade of product, owing to the fact that down to a certain limit the fine iron (80-mesh) cannot be thrown out. The fine and coarse proportion of the iron sulphide contents will be found nearly constant in any grade of concentrates, so that the less total iron sulphide there is to start with, the less fine iron sulphide there will be to contend against.

A sample of 58.4 per cent concentrates was separated into fine and coarse, over an 80-mesh sieve. The fine ran only 40 per cent zinc and 16 per cent iron, while the coarse ran 60.3 per cent zinc and 2.5 per cent iron. This concentrate was made over the separator out of heads running 20 per cent zinc.

The handling of concentrates carrying more than

One class of ore has been found in Wisconsin that is difficult to clean of lead. The heads run 3.5 per cent, and 1.34 per cent is the lowest result that can be obtained in the finished product.

The ores of the Empress mine, running 2 per cent lead, are easily cleaned up to 0.4 per cent, and have been made as low as 0.1 per cent. This separator depends for its action upon the varying conductivity of zinc-blende and marcasite to static electricity. A charge of static electricity is easily conducted through marcasite, but the zinc-blende remains comparatively inert. The machine has already been described in detail in the columns of the JOURNAL.

The general type of mills in the Wisconsin district is that in use at Joplin. The best mills are equipped with Hopper feed, 14-in. crusher, three sets of rolls, revolving screens and two lines of jigs. In some of the mills, notably the Enterprise and Rowley, there is only one line of jigs, while the Hoskin mill was equipped with three lines of jigs. There are 12 plants in the district, but not more than half of these are in successful operation. Among the idle mills at the present time may be noted the Strawbridge, Coltman and Trego.

A comparison of the conditions in the Wisconsin and Joplin districts is of considerable interest. The advantages in favor of Wisconsin are:

Extensive Deposits of Ore.—It is probable that the deposits of ore in Wisconsin are of greater magnitude, on the average, than those in Joplin. For example: The Hoskin mine has a drift 700 ft. in length along the north pitch. The distance from the north and south pitch is about 400 ft. The vertical thickness between the top and bottom flat is approximately 100 ft. This would indicate something over a million tons of ore that may reasonably be expected from this property. As to whether the content of 'jack' in this ore will remain fairly uniform, that is another matter. The same chances would necessarily have to be taken on this point as in the Joplin mines. As far as I know, no Joplin property has anything like a similar tonnage developed. In those cases where the 'brangle' is not sufficiently rich to be put through the mill, and only the 'pitches' and 'flats' are worked, the mine is exhausted with great rapidity.

High Percentage of Concentrates Recovered from the Ore.—It is the usual expectation in southwestern Wisconsin that the concentrates produced will amount to at least 20 per cent of the ore treated, while in the Joplin district a safe estimate is 5 per cent. At first glance, this would indicate that the Wisconsin ores are four times as rich as the Joplin ores; and so they are, in weight of concentrates produced; but the average Joplin concentrate assays 60 per cent metallic zinc, while the average of the raw

concentrates produced in Wisconsin assays less than one-half of this figure. The result is that a further operation is required with the Wisconsin ores, and after the iron is separated the weight of merchantable product cleaned up is not, on the average, more than 10 per cent of the weight of ore treated, and the increased cost of treatment about balances the increased richness of material handled.

Somewhat Lower Rates for Labor.—Wages average $1.75 for miners in southwest Wisconsin and $2 at Joplin, but the greater efficiency of the Joplin miner makes this advantage more apparent than real. Joplin has a further advantage in the matter of transportation. Almost every mine of importance in the Joplin district has a railroad switch that brings coal direct to the bin. Supply houses are located conveniently near the mines, making it unnecessary to carry large stocks of fittings and other materials.

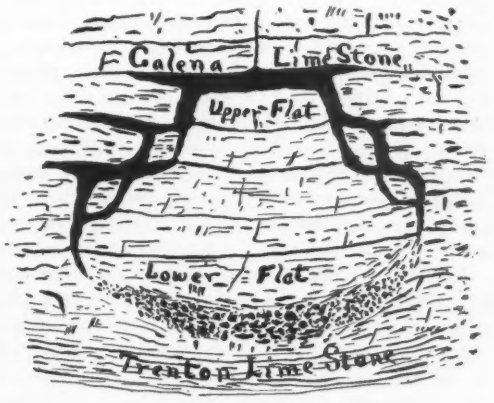
Southwest Wisconsin is remarkable for its inaccessibility. The mines are more scattered than in southwest Missouri, and thus far the railroads have put in no extra switches to aid the miners, although one is now being constructed to the Hoskin and Kennedy mines. It is true that the Chicago & Northwestern runs through the zinc district, and the St. Paul touches its northern edge. Down at Galena the Illinois Central gives an outlet to Chicago, but the operator used to the facilities of the Joplin district finds the condition in southwest Wisconsin almost intolerable. Altogether, there is little to choose between a 5 per cent mine in southwest Missouri and a 20 per cent mine in southwest Wisconsin.

I have been asked by a number of the operators in southwestern Missouri to give my opinion of the future outlook of the Wisconsin district. That there is zinc ore in large quantities in southwestern Wisconsin does not admit of argument, but the development of such a camp as this must be carried on by men of means.

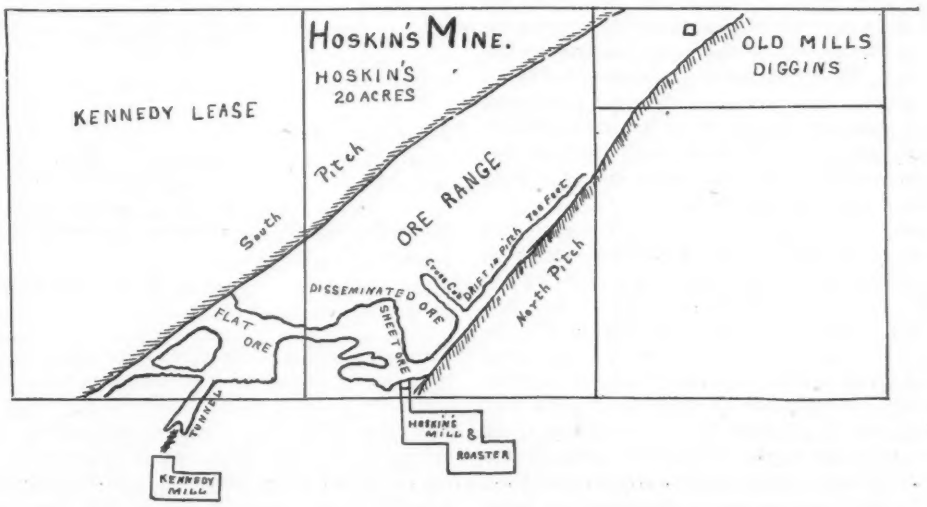
It is not, like southwest Missouri, a poor man's camp. A satisfactory plant, including roaster and magnetic separator, costs not less than $20,000. Hand jigging is only possible in rare instances, as in the old Blende mine, near Benton, where perhaps $200,000 worth of ore has been culled out by hand and sold to the smelters. The development, therefore, will be slow and the setbacks many. Some companies will under-estimate the amount of money needed to carry their operations to a successful stage; some will become discouraged and abandon the district. Those mines where only the 'pitches' and 'flats' can be worked will rarely last long enough to return the investment for plant. It is the great cores of disseminated ore that must be depended upon to furnish a continued output. The present weekly production is about 350 tons of concentrates.

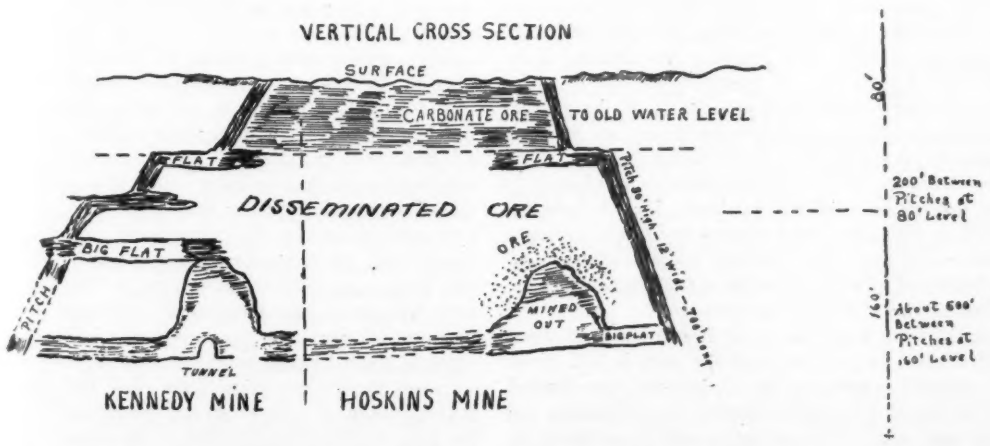
In my opinion, a period of from five to ten years will elapse before the Wisconsin fields will become a serious rival of the southwest Missouri district, but by that time it is probable that the output will be ten times as great. I have examined the Tennessee and Arkansas deposits, and am of the opinion that neither need be considered seriously. The Wisconsin fields, however, will in time become an important factor in the zinc situation.

STRAWBERRY BLONDE MILL AT STRAWBRIDGE.



IDEAL SECTION OF 'FLATS' AND 'PITCHES.'





ASSOCIATION OF GERMAN SHEET ZINC MANUFACTURERS.—At a recent meeting of this association, held in Berlin, a resolution was adopted providing for the dissolution of the society on January 1, 1904. This step is said to have been decided upon, owing to the refusal of an important manufacturer in Westphalia to abide by the market schedule of the association in disposing of its product. There is some possibility that the Silesian manufacturers will form a combination among themselves, and operate independently of the Belgian and Westphalian concerns. Whatever may be the outcome, it is not expected that there will be any material change in the prices of sheet zinc, as they are regulated more or less automatically by the prevailing quotations of spelter.

ASBESTOS IN FINLAND.—A recent communication calls attention to the occurrence of asbestos of commercial quality in central Finland. A company has been organized to explore the deposits, and during the present year has been actively engaged in this work. It is stated that large quantities of the mineral have been exposed ready for quarrying and preparation into merchantable form. In color the asbestos is pure white, and by its soft, fibrous nature, it is suited for spinning, and for manufacture into board and insulating materials. The property is situated about half way between Kupio and Joensuu, near the railroad connecting these towns.

A SYSTEM OF HANDLING SAND MECHANICALLY FOR CYANIDE VATS.*

BY CHARLES BUTTERS AND ALBERT F. CRANK.

The Virginia City works of Chas. Butters & Co., Ltd., are situated on the eastern side of a cañon leading down from Virginia City, and at a point about three miles distant from that town. This site was chosen, close to a large heap of tailings, in order to conveniently treat not only these tailings, but also ore from the Comstock lode and other veins in the vicinity. An inclined tramway with two lines, worked by a wire rope, is carried westward from the works across the cañon by a wooden trestle bridge, and continued for 1,200 ft. along the length of the heap. The tailings are loaded by horse scrapers direct into the tram-cars, for transport to the works.

As there is a fall of 600 ft. between the mean level of Virginia City and the works, tailings can be sluiced down by a small stream of water from any heap in the camp, along a 10 by 10-in. wooden flume, direct to the classifier in the works. About three miles of main flume and a mile of branch flume have been built, and are now in successful operation.

The tramway and flume enable tailings to be conveyed to the works at an exceedingly low cost per ton, as the amount of shoveling is reduced to a minimum. The next point is to be able to handle the sand economically between the collecting and leaching vats, and discharge it to the waste heap.

The works are designed principally for the treatment of slimes, which make up 55 per cent of the total amount of material treated, the remaining 45 per cent being sand. Consequently, as 275 tons are treated daily, 124 tons of sand have to be dealt with. Labor in this district is scarce, and workmen command high wages; therefore, supposing handwork to be adopted, the capacity of the sand department would be governed by the amount of labor available for shoveling, while the value of the tailings that could be worked at a profit would in part depend upon the expense of this labor.

The machines adopted to do the work are portable excavating and distributing appliances, capable of dealing with damp or drained sand. They are the invention of Mr. Hiram W. Blaisdell, of Los Angeles, Cal. It was claimed that they would discharge, transfer and distribute more sand in a given time than was possible by hand labor, even when mechanical conveyors were employed. It was further said that all the labor in the sand-house could be done, according to the size of the works, by one or two attendants. Lastly, it was secured that, owing to the thorough mixing during the process of excavation, and to the subsequent light and even distributing of the material in the vats, the cyanide solution penetrated more rapidly and leached more completely than in any light system now in vogue. As the Blaisdell machines are new factors in cyanide practice, it is well to describe them fully, and to state the results obtained, as the matter is sure to be of interest to mining engineers engaged in similar operations.

From August 4 to August 7 of this year a series of records were taken of daily performance under regular working conditions. The results obtained, together with the records of the past six months, confirm the original estimate of the value of the system, and substantiate the claims advanced by the manufacturers. At the present time, the amount of material treated daily in this department is 250 tons—that is to say, 125 tons are handled twice in that period. Under the direction of the manager of the works, the shiftsman on the sand tanks makes the required changes in pump connections, valves and solutions, and operates the excavating plant in a working day of 10 hours.

The accompanying plan exhibits the general arrangement of this sand-handling plant. It consists of a Butters distributor, for charging the collecting vats; one Blaisdell bottom-discharge excavator, for discharging all the vats; one Blaisdell centrifugal distributor, for charging the leaching vats; and a combination of four 16-in. belt conveyors, for transport of the sand.

There are eight wooden tanks, or vats, each 30 ft. diameter by 6 ft. deep, intended for 125 tons of sand each; they are set upon one continuous foundation. Each vat has a central discharge gate, with chute leading to a conveying belt below. The two north vats are used for collecting and draining the sands received from the tailings wheel, and their contents are subsequently removed to one of the six leaching vats for cyanide treatment.

Conveyor No. 1, located below the two collecting vats, is approximately 65 ft. long, and conveys to the left, or northward. Conveyor No. 2 is 20 ft. long, and conveys the discharge of No. 1 at right angles, delivering to conveyor No. 3, also at right angles. At the north end, where the discharge of No. 2 is received, conveyor No. 3 has an inclination of about 11° for 67 ft., beyond which it runs level for 123 ft. to the end of the line of vats. By this incline the sand is brought from a level 4 ft. below the bottom of the vats to a level 18 in. above their tops. In ground plan this conveyor is parallel with the line of vats, with a distance of 17 ft. 8 in. between center lines. A tripper extends from the Blaisdell distributor and diverts the load from conveyor No. 3 to a short conveyor upon the machine. Conveyor No. 4 is placed below the discharge gates of the six leaching vats, and is arranged so that it can be run in either direction. When running north (or to the left), the discharge from leaching vats is delivered upon conveyor No. 1, and then carried around the system to the distributor. When running south, the discharged tailings are carried to the waste heap. In place of No. 4 conveyor, a launder leading to the waste dump is employed, when single treatment sand is being worked.

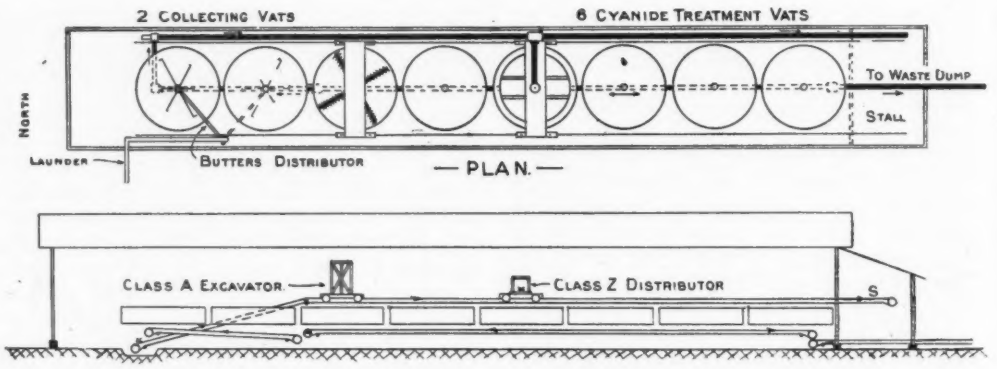
The excavating and distributing machines are movable steel structures, spanning the tanks and traveling upon 16-lb. rails placed 9 in. outside, 12 in. above, and extending the length of the line of vats.

It has been found, with the use of the excavating and may pass far enough beyond the last vat to allow room for the excavator in operating that vat. The first two vats, filled with the Butters distributor, do not require the Blaisdell machine. Had it been desired to transpose their relative positions, a shuttle table could have been inserted midway of the vats, by means of which the excavator could be withdrawn, allowing the distributor to pass by.

It has been found, with the use of the excavating and distributing system, that the pulp is laid down so perfectly in the vats that no benefits were derived by the use of a second treatment; and, although the plant was laid out for giving a second treatment, or several treatments, to any vat, these have been found unnecessary and have been discontinued.

As employed in these works, the Blaisdell excavator consists of a steel truss bridge, supporting at midspan the excavator and driving gears, and at one end the motor and traverse gears. The bridge deck is 33 ft. over all in length and 5 ft. 6 in. wide. The height of the truss is 10 ft. The bridge is supported upon trucks, each of which contains two 15-in. flanged wheels, 10 ft. between centers. The span or distance between rail centers is 31 ft. 6 in. The midspan vertical truss bridge carries cross-head guides, together with the heavy screws for raising and lowering the cross-head. The latter contains the upper bearing of the spindle, and a thrust-box supporting the weight of the spindle, excavator beam and disks. A heavy frame in the bridge floor carries a bearing, in which rests the main bevel gear-wheel, driving the excavator spindle. This gear serves also as the lower guide for the spindle, and is centered below the cross-head bearing. Power is transmitted to the spindle by steel keys secured in the gear, and, entering keyways cut the full operating length of the spindle. Securely keyed to the lower end of the latter is a cruciform beam of structural steel parts.

The total over-all length of the two long arms is 29 ft. 8 in., thus allowing a 2-in. clearance when operating a 30-ft. vat. The short arms have an overall length of 11 ft. 4 in. Bolted to the under side of these arms are cast-iron hangers of graduated lengths, each terminating in a bearing, wherein revolve hardened steel spindles projecting from the center of the steel excavator disks. These bearings are so designed that sand may not enter.



PLAN OF VIRGINIA CITY PLANT FOR TREATING SANDS.

The disks are placed obliquely to the radial lines. The angle varies from 15° to 25°, the larger angle being nearest the center. Twelve disks about the center are flat plates, while all other disks are dished with spindles projecting from their side. The concave side is presented to the work. There are in all 46 disks, so spaced from the center that the position of each disk upon its respective arm falls upon a spiral generated from the center, in the direction of rotation of the beam. A radial section of the contents of a vat during excavation would show a series of 36 surface undulations. The hollow of these waves will rest upon a line having a fall toward the center of about 1 in. in 12 feet.

The angular setting upon the arms presents the edge of the disks to the work as a cutting line. As this advances, the sand is cut with a rolling and nearly vertical motion, with little friction. The line of cut extends in a diagonal across the furrow, and a shearing rather than scraping action is secured. The dished shape of the outer disks gives the necessary lead and clearance to the cutting edge. As the disks revolve only when in contact with the sand, it follows that there is no friction due to drag, so that the power over and above that required to overcome internal machine frictions and the insertion of the cutting edges is applied to the actual moving of sand. This is raised by the revolving disks until dislodged by gravity, when it rolls from the dished surface into the path of the following disk. The weight of the beam, with spindle and disks, is sufficient to force the disks into the sand, but the depth of cut is regulated by the feed screws. These receive automatic motion, or feed, from the bevel gear pinion-shaft by means of a pawl, ratchet-wheel, and a gear-chain. The pawl makes 25 strokes per minute, and may be set as desired to feed from one to seven teeth upon

*Abstract of a paper read before the Institution of Mining and Metallurgy, London, November 19, 1903.

the ratchet-wheel with a beam revolution of five per minute. This produces a vertical motion of the excavator spindle of from 0.02 to 0.135 in. per revolution. The range of adjustment allows the work of excavation to be pushed to the maximum limit allowed by the firmness of the sand or the capacity of the conveyors. There is, in addition, a belted connection between the ratchet-wheel shaft and the main shaft, by which a vertical speed of 14 in. per minute may be secured for rapid raising after excavating, or for adjustment before a run.

An automatic device upon the cross-head guide may be set to stop the excavator at any desired depth, and a similar device in a permanent position at the top of the guides prevents injury from raising the beam too close to the bridge.

Power for the machine is taken from two overhead wires by a trolley, and supplied to a direct-connected motor upon the bridge, where is also located the switchboard panel, containing the rheostat with reversing switches and fuse-block. The motor is back-geared to a line of shafting extending to the center of the bridge. From this shaft, power is taken to operate the traverse gear train for the following four purposes: Shifting from vat to vat, operating the boring bar, rapidly raising and lowering the feed, and driving the countershaft of the excavator spindle gears.

In dealing with a filled vat, the boring head is first brought over the opened central discharge valve and driven through the sand. The excavator beam is then raised to clearance position, and is brought over the discharge opening by moving the bridge forward. The beam is now lowered until the disks meet the sand, when the revolving gears may be started and the required feed set. The machine then runs without attention until it comes into contact with the automatic stop.

The Blaisdell centrifugal distributor is supported at midspan of a movable steel bridge having a deck and trucks similar in design to those of the excavator. It is not as heavy in construction, and the trussing is secured by suspension rods and spreaders below the deck. At one end of this bridge a tripper is placed, overhanging conveyor No. 3, and diverting the sand from the latter to a conveyor upon the bridge deck. This discharges into a cast-iron hopper at the bridge center. A revolving vertical spindle passes through the hopper and has a horizontal steel disk keyed upon the lower end. Riveted to the upper surface of this disk are short radial vanes of angle iron. This distributor and spindle are supported by bearings above the hopper. Pedestals extend upward from the hopper, and contain the bearings mentioned and those of the bevel gear shafts. The pinion-shaft of the latter is belted to the head shaft of the bridge conveyor.

The vaned disk, or distributor, revolves rapidly, and sand falling from the hopper upon the whirling surface is showered evenly over the vat surface below. Power for the distributor is taken from the overhead wires in similar manner as for the excavator. The speed of revolution may be changed bv both cone pulleys or rheostat.

A cylindrical guard-ring of light sheet-iron, 15 in. wide and 24 ft. in diameter, surrounds the distributor. It is supported upon brackets extending from the bridge, and has a 3-in. clearance over the side of the vats. This ring prevents the loss of stray sand particles when filling near the top of the vat. When working the distributor, the shiftsman starts the traverse gears, and runs the distributor into position over the closed central valve of an empty leaching vat. He then starts the distributor and conveyor. Leaving the machine, he passes along the sand-house to the switchboard of the motor driving the conveyors. After starting the conveyors, he passes on to the excavator, which he has previously placed in position. He now starts it, and, after watching for a few minutes, to see that the feed of excavation is properly set, he leaves it to itself.

This machinery, during the present year, has demonstrated that the work in the sand-house may be executed regularly in a given time entirely independent of labor conditions. Both the supply and cost of labor may be disregarded, for the primary consideration has now become merely the cost of power. It has been demonstrated that the cost per ton for handling a given quantity of sand between the tailing wheel and waste dump, once or oftener, may be determined in advance to a nicety. The tests show that the cyanide manager has in the excavator a valuable instrument, which is of service also in understanding correctly the conditions existing in the leaching and collecting vats. The power required to discharge a vat may be quickly determined by the readings from the volt and ammeter. Comparison between this reading and a standard table of readings will show the degree of firmness with which the sand is packed in the vat.

An uncalled-for rise in the power used under regular working conditions will call attention to a possible increase of the percentage of slimes or fine sand present, or to incomplete draining. The compact nature of sand in a collecting vat is well known. In these works, as already stated, treatment is not carried out until the sand has been removed from the collecting vat and transferred to the leaching vat. One advantage gained is that the subsequent percolation is exceedingly sure, rapid and thorough; 125 tons of sand will, when drained, form a deposit of 3 ft. 6 in. deep in a 30-ft. collecting vat. After the complete disintegration secured by the excavating process, the sand is again broken up and blended by the action of the distributor, with the result that the 125 tons will produce a depth of 5 ft. 8 in. in the 30-ft. leaching vats before the introduction of solution, and subsequently settle 8 in. during treatment. Or 1 in. in depth of sand in the collecting vat will produce 1.62 in. in the treatment vat before percolation, and 1.42 in. afterward. The opportunity secured for complete percolation is obvious.

Those familiar with the chlorination process will better understand the condition of this sand when I state that the loose condition which is secured by screening the charge into a chlorination tank is here obtained by means of the Blaisdell distributor. A chlorination tank, 20 ft. in diameter, will be filled to a depth of 7 ft. 3 in. by screening in an 80-ton charge of roasted concentrates. This depth decreases 8 in. by subsidence during treatment. The charge will therefore weigh 70 lb. per cu. ft. before and 77 lb. after treatment. With the distributor at Virginia City, these weights are 63 lb. and 71 lb., respectively. In the first instance, the contents settled 10.1 per cent of the original depth, and in the second instance 11.7 per cent. It appears from this that there is less packing from the distributor action than from the screening method, which has been hitherto the most perfect known.

At Virginia City the yearly cost is $84 per electrical horse-power, or 0.96c. per horse-power-hour. An addition of 15 per cent should be made to cover the loss in the motor-generator set. This brings the cost up to 1.1c. per horse-power-hour.

At Virginia City the yearly cost of one electrical horse-power is $84 per horse-power-hour.

The total power used by this system for the double handling of 125 tons a day throughout the sand-house creates a daily expense made up of the following items:

	Cents.
Discharging collecting vat, 30.5 h. p. hrs. @ 1.1 c.	33.55
Conveyors, Nos. 1, 2 and 3 41.5 " " " " 0.96 "	39.80
Distributing ..... 8.5 " " " " 1.1 "	9.35
Discharging leaching vat, 11.5 " " " " 1.1 "	12.65
Total cost for 125 tons	$95.35
Total cost for 1 ton	$0.763

It has been estimated by the Blaisdell Company, the manufacturers of these machines, that wear of disks and parts will amount to $50 per annum, and an estimate based upon the past six months' use shows that this amount is correct. To this may be added $30 for grease, waste, oil, etc., required by the entire plant. This, then, would give a total of $80 per annum for maintenance, or 21.9c. per day.

The daily working costs may be tabulated as follows:

	Cents.
Power	95.35
Supplies and wear	21.90
Labor	60.00
Total	177.25
Cost per ton	1.415

The total daily cost for all handling, changing of solutions, and general sand-house work, is the cost of power and maintenance, as shown, plus the total time of the operator ($3 per day), making $4.17, or 3.336c. per ton.

If the works had to be enlarged from a capacity of 400 tons daily to a capacity of 1,000 tons, and the percentage of sand continued about what it is now, the only change required for enabling the machines to handle the 480 to 500 tons of sand twice in the 24 hours would be to replace the present motor upon the excavator by one of greater horse-power, allowing a greater feed upon the collecting vats. There is no reason why an excavator should not be made sufficiently strong to discharge 100 tons an hour from a connecting vat. It would, of course, have to be made heavier than the present machine, which is intended for the present duty, and which has fulfilled all requirements.

The introduction of the Blaisdell excavator marks a new era in the construction of cyanide plants, and is so important that it will be worth while to introduce it even in the case of existing sand plants which admit of the necessary modifications. The reasons for its use are strong—the saving of gold by higher extraction, and the reduced cost of labor.

El Oro Mining & Railway Company, of Mexico, is now erecting a complete cyanide plant for the new 100-stamp mill. The portion of the works for treating the sands consists of nine collecting vats, 22 ft. by 10 ft., served by one Blaisdell excavator, and of 14 leaching vats, 40 ft. by 6 ft., in two rows, served by one excavator. By arranging a series of Robins belt conveyors, the contents of any one leaching vat can be transferred to any other leaching vat, or conveyed direct to the tailings dump; and the capacity of excavators and of the belt conveyors is 100 tons per hour. The estimated cost of working this plant in Mexico, at the rate of 200 tons per day, is 3c. per ton, and it requires the services of two men, the cost of power being taken at $10 (American) per horse-power per annum.

The conditions under which the tanks are filled are so perfect that only one treatment is required for complete extraction, as is the case in a chlorination tank, because the sand is in the same condition that it would be if it had been screened into the tank.

No cyanide solution is ever run into the collecting tank, as its contents, after having been filled from the battery, are allowed to drain, and are then transferred by means of the excavator directly to the leaching tank. Therefore, no loss of gold can take place from cyanide solution having been introduced into the collecting tank, as is the case when the collecting tank is filled directly from the battery, and gets its preliminary treatment of cyanide solution in the same tank.

At Virginia City, as much as 50 per cent of gold was found dissolved out of the charge, by filling into a collecting tank in which the charge before had received a preliminary cyanide treatment, and, strange to say, this loss continued for over two weeks after the use of cyanide in the filling of the vat had been discontinued. While no trace of cyanide could be obtained at any time, still the loss went on, until after two very anxious weeks it gradually stopped. This occurred on two different occasions. At first it was attributed to an excessive amount of ferric salts in solution, acting possibly as a solvent for gold; but it was found later that it was from the traces of cyanide that could not possibly be detected by any chemical test.

Mr. Hennen Jennings and Mr. Butters had both made a series of determinations at Johannesburg as to the gold in the battery water from this source, and with similar results—gold was invariably found. It is not easy to state the exact loss from this source, but that it is a source of loss which should be elimi-

nated I think all engineers and metallurgists will agree. The use of the Blaisdell excavator reduces the number of vats required to produce a given result, even with the separate collecting vats, as rapid percolation takes place in all the vats used for leaching, while at present only one-half the vats are in a condition for perfect percolation.

The elimination of all outside labor from the works will naturally appeal to everyone, as the shiftsmen with this apparatus can transfer the contents of sand tanks and discharge them when they are in order, and need not wait until other workmen are ready. Much time is saved, as the plant is much more elastic, and nothing either waits or depends upon hand labor.

SULPHURIC ACID MANUFACTURE BY THE CONTACT PROCESS.

G. Bodländer and K. Köppen, in the *Zeitschrift für Elektrochemie*, 1903, IX (28), pp. 559-568, and (39), pp. 787-794, state that the production of sulphur trioxide is favored, or the complete conversion of dioxide into trioxide is approached, by increasing the oxygen concentration in the reversible reaction $2SO_2 + O_2 = 2SO_3$. The reaction speed is similarly influenced, but while the equilibrium depends only upon the relative concentration, the reaction speed depends upon the absolute concentration; and increase of oxygen concentration may, by virtue of decreasing the absolute concentration of sulphur dioxide, retard the reaction more than it accelerates it by virtue of its own concentration. Dilution with excess of air retards the action at first, while it is rapid, but accelerates it greatly in the later stages, when it is slower; so that, on the whole, a conversion of 95 per cent will be reached more rapidly with excess of air than when only the quantity theoretically required is present. Experiments with the theoretical mixture of sulphur dioxide and oxygen diluted with different proportions of nitrogen showed that the absolute speeds of reaction were diminished, but the relative speeds were unaltered; *i. e.*, the amount of conversion in 10 minutes, for example, bore in every case the same relation to the amount in three hours. These experiments showed, moreover, that the concentration of the sulphur trioxide formed also influenced the speed of reaction (retarding it as it increased), though the reaction at these low temperatures is not reversible, since the sulphur trioxide does not dissociate. Experiments showed also that excess of oxygen hastens the completion of the oxidation of the sulphur dioxide, so that although at first it causes a retardation, it effects, on the whole, an economy of time, and therefore a saving of space and contact-substance. When platinum is used as the contact-substance, the reaction speed is sufficiently great for carrying out the process at temperatures well below that of incipient dissociation of sulphur trioxide, but with other contact-substances a sufficient reaction speed can only be attained at temperatures at which the dissociation-pressure of sulphur trioxide has notable values. The effect of pressure above atmospheric is favorable to the reaction. When there is excess oxygen in the gas the effect of increase of pressure is very considerable. Inasmuch as increase of pressure also raises the speed of reaction, the use of high pressures on an industrial scale seems to be a possibility for the future.

MINERAL SURVEY OF NIGERIA.—According to a late press report, plans have been formed for undertaking a comprehensive mineralogical survey of the British Protectorate of southern Nigeria. The expedition is to be under the charge of J. L. Parkinson, of Cambridge University, and will remain in the field for a period of three years. It is probable that upon the completion of this survey a second expedition will be sent into northern Nigeria for the same purpose. Gold and tin are said to occur in these territories, and it is hoped that the surveys will collect valuable information relating to their mineral resources.

PRESENT CONDITION OF GOLD MINING IN ARCTIC AMERICA.—II.

By R. A. F. PENROSE, JR.

(*Continued from page 809.*)

THE YUKON VALLEY REGION.

The Yukon river crosses the international boundary between Alaska and the Yukon territory of Canada about 77 miles below Dawson, and continues thence through Alaska to Bering sea, over 1,500 miles below Dawson. Many placer-mining camps are being operated at points along the tributaries of the Yukon river throughout Alaska, while, even in the sands of the Yukon itself, gold in fine particles has been found in many places.

In descending the Yukon from Dawson, Forty-Mile creek, with its numerous tributaries, is the first gold district of importance. The stream received its name from the fact that it is 40 miles below old Fort Reliance. It rises in Alaska, and flows easterly, emptying into the Yukon within Canadian territory. Active mining operations were carried on here from the time of the discovery of the district in 1886 until the Klondike was discovered, when many of the miners left for the new region. Even yet, however, considerable mining is going on.

About 25 miles below the boundary is the settlement of Eagle, a United States military post, in the neighborhood of which a little placer-mining is being done.

A little over 200 miles below the boundary is the mining settlement of Circle City, the headquarters for the Birch creek district. This creek, with its various tributaries, has been worked for gold since 1893, and its output, even yet, is much greater than that of any other district in the Yukon valley below the Klondike.

At Fort Yukon, just north of the Arctic circle, and 300 miles below the boundary, gold has been found in the river sand, but no important operations have been carried out in this neighborhood.

The town of Rampart, about 575 miles below the boundary, is the mining center for the desultory placer-mining in the neighboring hills known as the Ramparts.

About 650 miles below the boundary is the settlement of Tanana, also known as Fort Gibbon, a United States military post at the mouth of the Tanana river. The Tanana is a large stream flowing northwest into the Yukon, and mining is carried on at many points along it and its tributaries. The mining settlements of Healy, Chena and Fairbanks are in the Tanana valley. Some gold has been obtained in this region for a number of years past, but the production has not been large. Recent news this fall, however, from that district lends hope for more profitable discoveries.

On the Koyukuk river, a large tributary flowing southwest and emptying into the Yukon over 800 miles below the boundary, considerable mining is being done, and in some places good results are being obtained. The principal mining centers in this region are Bettles, on the Koyukuk, about 600 miles above its mouth; Peavy, still further up; and Cold Foot, about 800 miles above the mouth. The region is reached by boats up the Koyukuk from its confluence with the Yukon. The possibilities of the region have not as yet been fully demonstrated, on account of its newness and, until recently, the difficulty of reaching it.

In many other places along the Yukon and its tributaries, not mentioned here, gold has been found and is still being mined, but as yet the production has not been very much. In the palmy days of Forty-Mile creek and Birch creek the production of the Yukon valley was larger than it is to-day, and in some years probably amounted to about $1,500,000. At the present time, however, from all the information that could be obtained from a trip through this region during the past summer, the production is probably less than half this amount. The cause of this falling off is partly the exhaustion of some of the rich discoveries, and partly the stampedes caused by other rushes, first to the Klondike, and later to Nome. Miners and prospectors from all over the Yukon valley, excited by the reports of fabulous discoveries, left their claims and went to these two localities. Moreover, the negligence of the United States government in dealing with Alaska is responsible to a great extent for the present conditions along the Yukon valley. The unexplored parts of our other western regions have been developed without much government aid, as the climatic and other conditions made it possible for private citizens to do this unaided; but in Alaska the bleak and rigorous climate, the difficulties of travel, the remoteness from civilization, the arctic sterility of the soil, the cost of supplies and, often, their scarcity at any price, all combine to require government aid before Alaska can be developed as it should be, and can be. What Canada has accomplished in the Klondike, suggests what the United States can accomplish in Alaska.

THE NOME REGION.

Cape Nome is a point on the southwest coast of the Seward peninsula, which is the western extremity of northern Alaska, separated from Siberia by Bering straits. The town of Nome is a few miles west from Cape Nome, on the immediate shore of Bering straits at the mouth of the Snake river. Gold was discovered in the Nome region in 1898, first on Anvil creek, and during the following year in the beach-sands where the town of Nome now stands. Before the discoveries at Nome, gold had been worked at several places along Golofnin bay in the southeastern part of the Seward peninsula, but had not, as yet, caused any great rush to the region. The Nome discoveries started the rush north, and before long the whole Seward peninsula, from Norton sound on the south to Kotzebue sound and the Arctic ocean on the north, was being prospected; so that at present, outside of the Nome district, we find the Seward peninsula divided into the Bluff district, the Cheenik district, the Council district, the Kougruk district, and the Port Clarence district. Of all these districts, however, the Nome district is still the most important at the present time.

Inland from Nome, the country gradually rises in a gently sloping tundra for two or three miles, and then more abruptly into hills from several hundred to over a thousand feet in height, totally devoid of trees and with only a covering of moss and Arctic shrubs. Anvil creek, a tributary of the Snake river, rises in these hills and has been the most productive of all the creeks of the district, though considerable gold has also been taken from Glacier creek, Dexter creek, Dry creek, and other streams. Anvil creek is now reached from Nome by the Nome & Arctic Railway, which runs at a rate of about six miles an hour up Anvil creek to the head of Dexter creek, a distance of about nine miles.

The gold in the beach sands has been mostly exhausted since its discovery, though some of the sand is still being worked over for a second or third time, or more. The rich beach sand was found eastward from Nome along the shore to the mouth of the Nome river, a distance of about three miles, and westward from Nome for three or four miles. Beyond these limits, gold in beach sands occurs in both directions, but it has been found in paying quantities in only a few places outside of the Nome district. Among these other places may be mentioned the Topkok beach in the Bluff district, about 40 miles east of Nome.

Beyond the Nome district, several localities in the other districts mentioned in the Seward peninsula have become noted for their richness. In the Bluff district, Daniels creek, the Solomon river and its tributaries, especially Big Hurrah creek, and the diggings just mentioned on Topkok beach, are prominent. In the Council district, Ophir creek has proved very rich, while other creeks have produced considerable gold. In the Kougruk district, Dahl creek and other streams have been more or less productive; while in the Port Clarence district some of the creeks have produced limited quantities of gold. Still further northeast, gold has been found in several of the streams flowing into the head of Kotzebue

sound, including the Inmachuk river, the Kewalik river and its tributary, Candle creek, as well as Shumnak creek, a tributary of the Kowak river. This region, however, has not yet been sufficiently explored to determine its true value. A limited amount of gold has been found in the streams in the neighborhood of Cape York, near the western point of the Seward peninsula. It may be said, however, that of all the streams on the Seward peninsula, the three that have so far proved the most productive are Anvil, Ophir and Daniels creeks.

WASHING GOLD ON ANVIL CREEK, NOME DISTRICT, ALASKA.

The whole of the Nome district and the rest of the Seward peninsula are said to have produced, up to this year, somewhere near $20,000,000 in gold, of which amount almost $1,000,000 is said to have come from the Nome beach, while the rest has come from other parts of the peninsula. The output of the peninsula for 1903 will probably be something less than $5,000,000.

Just as in the Klondike region, so in the Seward peninsula, only the richest gravels can be worked, owing to the unfavorable conditions existing. The grade of the gravel varies in quality very much as in the Klondike region, some of it running very high and some of it running low. Gravel running $30 to $50 a cubic yard is considered first-class, though lower-grade gravel is worked at a profit, and on the other hand much higher-grade gravel has been found. It is stated that on the claim of Caribou Bill, near the head of Anvil creek, $1,280 was taken out in 12 pans of gravel.

Most of the large operations in this region are done by hydraulic mining, which is carried on much more extensively here than in the Klondike region. The overburden of barren ground is often thinner than in the Klondike, and this greatly facilitates operations. Thus on Anvil creek the overburden is often only 2 or 3 ft., with 3 to 6 ft. of pay gravel below, and the whole thing is broken down by hydraulicking and passed through the sluices. Smaller work is carried on with sluicing, rocking and panning. A dredge has recently been started to work on the beach sands at Nome, and steam-shovels are being introduced in some places in the interior. A small stamp-mill, treating gold-bearing quartz, is being operated this year on the Solomon river, in the Bluff district, east of Nome. Hydraulicking in this northern region is not so rapid a process as further south, on account of the frozen condition of the gravel. The force of the water easily breaks down the frozen ground, but the stream of water must still be kept for some time on the gravel after it has been broken down, in order to thaw the frozen lumps, before they enter the sluices.

When extensive mining first began in the Nome district, the same difficulty was experienced, as regards water, as was had in the Klondike, but in the Nome district this has been to a great extent overcome by the rapid and energetic introduction of fluming and pumping systems, supplying water for hydraulicking, and permitting the working of large areas of placer-ground which otherwise could not be handled. The Miocene Ditch Company has ditches which bring water from the mountains many miles distant. The Wild Goose Company has a pumping plant on Snake river which pumps water three or four miles and to a height of several hundred feet. The Pioneer Mining Company pumps water from Snake river up Anvil creek three or four miles, to a height of over 600 ft.; the Nome Exploration Company also pumps water from the Nome river for about one mile up Dexter creek, to a height of almost 1,000 ft. The town of Nome itself is supplied with good water, brought in pipes from the mountains.

Supplies are brought direct by boat from Seattle to the Seward peninsula and are laid down at coast points at fairly cheap rates, but when they are carried into the interior in wagons, or on the backs of horses or men, they become very much more costly. Hence short lines of railway, connecting the larger mining districts with the coast, are becoming not only very desirable, but probably profitable, investments on the Seward peninsula. The Nome & Arctic railway, already mentioned as running from Nome up Anvil creek, has been of great service in developing the country, and is said to have proved very remunerative to the promoters. A new line has been started this past summer, called the Council City & Solomon Railway, about 45 or 50 miles in length, connecting Council City and the Solomon river in the southeastern part of the Seward peninsula.

In closing this article, the writer wishes to express his high appreciation of the many acts of kindness and courtesy shown him by the people of Alaska and the Klondike during his journey through those regions last summer. Such treatment, especially in a remote country, can never be forgotten, and nowhere can there be found more cordial hospitality than in those pioneer settlements in the far north of the United States and Canada.

WASHING GOLD ON THE BEACH, NOME, ALASKA.

A METHOD FOR THE SEPARATION OF COBALT AND NICKEL.—The following method for the separation of cobalt and nickel and the determination volumetrically of cobalt has been proposed by R. L. Taylor (*Chemical News*, 1903, page 184). By using a neutral solution, the cobalt can be completely precipitated as black oxide by adding barium or calcium carbonate in the presence of bromine. The time required is from 5 to 10 minutes. The precipitated oxide of cobalt may be represented approximately by the formula Co_3O_{14} or Co_7O_{11}. The author believes that the composition of the oxide is sufficiently uniform for the determination of the cobalt by estimating the amount of iodine set free. Experiments in this direction have given very satisfactory results.

PREVENTION OF DUST IN MINES.*

By CHAS. B. BRODIGAN.

In order to prevent the excessive dust raised by blasting in the mines at Johannesburg, thereby lessening the danger from miners' phthisis, it appears desirable to aim at the formation of mud at the point of application of the drill. One method is to adopt the Bornet drill, which is being used successfully at the Anzin colliery in northern France. It consists of a hollow drill down which water is forced; in fact, it is the predecessor of the Leyner drill, now being used with some success on these fields. The weak points about such machines are: (1) The cost of the hollow steel; (2) trouble in sharpening, and (3) supplying water to the drill while at work.

I was unable to see the Bornet drill at work, by reason of a strike in the Anzin district, which had caused work to be suspended.

Another method is to use the Brandt rotary hydraulic drill, which is the only drill employed in boring the heading for the Simplon tunnel. Through the kindness of Dr. Foster, and Mr. James Fox, one of the consulting engineers to the tunnel company, I was enabled to see the drills at work. They were advancing the heading at the rate of over 20 ft. per day, and the work was being carried out under almost perfect hygienic conditions, despite the fact that at the Swiss side the rock temperature was 123° F.

The Simplon tunnel, when completed, will have a length of about 12.3 miles, and at the time of my visit the heading from the Swiss side had been advanced 5 miles. In order to secure an adequate supply of air to the men working at the face, two parallel tunnels about 50 ft. apart had to be driven, the ultimate intention being to have one for the 'up' and the other for the 'down' traffic, but for the present, one bore will easily carry it, so that only one (No. 1) tunnel is now being completed. These two parallel tunnels are connected by cross-passages every 200 m., though, as the heading advances, only the nearest cross-cut to the face is kept open. In No. 2 tunnel, that is, the tunnel not at present being completed, all the water-pressure and air-pipes are situated; it also carries the water flowing from the face of both tunnels. In advancing the heading, No. 1 tunnel is kept ahead of No. 2, so there is always a dead end beyond the nearest cross-cut to be ventilated. This ventilation is secured by laying a 14-in. pipe from the cross-cut air-current to the face, and using a high-pressure water injector, directed into the ventilation pipe, to force or induce air right into the face.

The tunnel headings have an area of about 8 sq. m., that is, about 7.5 by 10.5 ft., and at the time of my visit the rock through which they were advancing was *antigoro* gneiss. This rock, though very hard in places, is much split up and breaks easily; so much so, that in the face ten holes suffice for a round. A two-hole cut is sufficient, and the remaining holes are arranged symmetrically around the cut holes. Each hole is charged with 2 kg., or 4.48 lb., of blasting gelatine, which is practically the same in composition as the explosives in use on the Rand.

The actual work of drilling is performed by a set of three Brandt hydraulic drills, mounted on a horizontal hydraulic rack bar 12 in. in diameter, which is carried at the end of a pivoted lever, mounted on a four-wheeled lorry. By this arrangement the complete fixing, drills and rack bar, can be run into position, the rack bar set at any convenient height across the tunnel and parallel to the face, and the latter firmly fixed in place, after attaching the valve of the rack bar to the pressure pipe and placing wood blocks at each end of the bar, by simply opening a valve.

Before discussing the actual work of drilling, a short description of the drill and boring bits will not be out of place. The Brandt hydraulic rotary drill consists essentially of two parts—a motor for rotating the drill and a pressure ram for forcing the boring bit into the rock. The motor is simply a twin-cylinder hydraulic motor, on the crank-shaft of which is a worm gearing into a worm-wheel that rotates the casing of the pressure ram. The ram slides on a feather key, and can be run in or out independently of the rotation of the casing. The whole machine is made of gun-metal. The boring bit is composed of extension pieces of hollow steel, with a 1⅝-in. central hole, each section having a threaded male and female screw of very high pitch at either end. The boring bit is made out of the same steel as the extension pieces and has at one end a male screw similar to the extension-piece screws; while the other end is provided with three cutting teeth, made by goring out with a milling cutter three triangular notches round the periphery of the hollow bit, and then setting the teeth so formed on the point of the anvil. These teeth, after sharpening with a hammer and tempering, are the cutting teeth of the drill. Of course, like any other drill, the bits must 'follow' one another, the starting bits being 3.5 in. across the set points and the finishing bits being 2.75 in. across. The boring bar and bit are made hollow throughout their length to serve as a passage for the exhaust-water from the drill-motor, so that when the water does its work in the motor-cylinder it passes through the hollow boring bar, and washes away any chips formed at the drill point, and, incidentally, kills all dust.

The work at the heading is in charge of a foreman, who has under him three machine men, who operate the machines, regulating pressure and fuel, and three helpers who change cutting bits and extension pieces as required. In starting, the boring bit is brought up slowly to its work, rotating all the while, and the actual cutting begins very tenderly until the drill beds itself; then the speed of rotation is increased to about eight revolutions per minute, the ram pressure being increased in a corresponding degree. The linear speed at which the boring bit cuts into the rock varies with the hardness of the rock, but in *antigoro* gneiss the writer has observed 1 in. per revolution of the drill, the pressure being 100 atmospheres. The effective stroke of the drill in use at the tunnel does not exceed 10 in., but may, of course, be more or less, according to the design of the drill. At the end of the stroke, or when a bit is blunted, the boring bit and bar are withdrawn from the hole by reversing the direction of the ram pressure; as soon as the bit is clear the machine helper strikes it sharply, unloosens the high-pitched screw, and screws on another extension piece and boring bit; this is the work of 30 seconds to 1 minute, and as soon as it is effected the drill again advances slowly to its work and cutting commences as before. Similar operations take place until the hole is finished.

The holes are usually bored about 5 ft. deep, and, as mentioned before, in the whole face 10 or 11 holes are sufficient to break the ground. The actual time of drilling the round, with three machines, varies from two to three hours. The number of boring bits dulled varied between 100 and 110 per round.

As soon as the face is drilled over, the usual procedure is to release the pressure from the rack or stretcher bar, slew it round 'end on,' the drills being still mounted upon it, and run it out on the rails to the nearest cross-passage; but during my visit one of the rack-bar rams developed a leak, and had to be sent out for repairs and a new one placed in position on the carriage. This necessitated unshipping all the drills, an operation which took 12 men nearly 15 minutes to perform, as the drills each weigh 830 lb. and the bar 890 lb. While the drills and bar are being removed three men charge and tamp the holes, and, as soon as the drill carriage is run out, shoveling plates are fixed up to within 6 ft. of the face and covered over with about 4 in. of loose stuff from the sides of the heading. The round is now ready for blasting, and the miners withdraw about 200 m. into the tunnel. Ordinary fuse is used, except in wet holes; the lengths are cut so that the shots explode at regular intervals. As soon as the first shot is heard the stop-valve of the high-pressure water-pipe is opened and a stream or spray of water is directed against the face, while another spray is directed into the ventilating pipe so as to induce the powder gases away from the face; the net result of these measures is that 10 minutes after the last shot had been heard, I was at the face again and found some of the men already at work. Of course, the smoke was rather thick on the way in, but once there, everything was comfortable; in fact, in the air stream now being directed toward the face, the temperature, I observed, was 31.5° C. or 89° F., whereas the rock temperature at the heading was 45° or 113° F.

The work of clearing out the rock broken by the blast is most interesting. The men engaged on this work are a gang quite distinct from the miners or drillmen. The gang consisted of 14 men, of whom eight were shoveling into two trucks, which had been brought in by a horse and pushed up close to the face; three men were working next to the face, where the trucks could not reach, filling coir baskets holding about 30 lb. As each basket was filled it was stacked close to the worker, and, when the trucks had been filled and were being taken out, the men who had been shoveling now lined up and passed the baskets of stuff from hand to hand 40 to 50 ft. down the tunnel, where they were stacked ready for loading into the trucks. The other three men were in charge of the horses and trucks. In this manner the work of clearing the face is made a continuous process; and, I must say, I never saw men work harder than those laborers; they share in the bonus granted to the miners for good driving.

The trucks used are low bodied and easy to shovel into; they hold about 1.5 cu. m. Eight to ten wagon-loads result from a blast, and the face is cleared within an hour to 1 hour and 20 minutes. The drillmen or miners, seven at each heading, all wear oilskins, and stand in water all day. The wages paid, exclusive of bonus, are: For machine men, 10 fr. per shift; laborers and helpers, 5 to 7 fr. Bare living costs 1½ to 2 fr. a day. A full shift of eight hours is worked, and no shift leaves until the succeeding shift arrives and takes over the work.

Miners' phthisis is unknown in these works; the men have an ample supply of air, the gases resulting from the explosion of gelatine are removed by the water spray, and there is no dust. Medical evidence bears out the fact that all these preventive measures are justified by the fact that the work is being carried on without any danger to the health of the workers; there has never been anything like it in tunnel driving before. The speed at which the contractors guaranteed to advance the heading is also a record, that is, 19 ft. per day, and they have shown that they can exceed this under ordinary conditions. Why, then, could not this drill be used on the Rand? Well, the Simplon tunnel had to be driven, let the cost be what it will; the contract was let at 69,000,000 francs, a sum which is now shown to be too little, and the experience of the eminent engineers in control of the work led them to decide that the Brandt drill was the only drill which would enable them to carry out the undertaking. Yet, when one of those eminent engineers asked me to believe that it was also the best drill for our work at Johannesburg, I disagreed with him.

For let us now inquire into the prices they pay for their work. They have at Brigue five pairs of pressure pumps, three capable of delivering six liters each per second and two capable of delivering 12 liters per second of water at 120 atmospheres pressure. The pumps were only working at half-load, this being found sufficient for nine drills at the face. In connection with them there are two hydraulic accumulators, and to drive this installation for the supply of pressure water alone, three turbines, aggregating 400 h. p., are installed. All the water is not used solely in the drills, but comes in handy for injector pumps and air injectors; but the fact remains

*Abstract of discussion on paper entitled 'The Prevention of Miners' Phthisis by Ventilation,' *Journal of Proceedings* of the South African Association of Engineers.

that for an installation of nine drills 400 h. p. for pressure is supplied, which compares very unfavorably with about 100 necessary for the nine air drills themselves. For supplying the pressure to these nine drills a 4-in. solid-drawn steel pipe is necessary, and it should be nearly 3-16-in. thick. Each drill uses a maximum of 2 liters, say half a gallon, of pressure water per second, so that a water-course would have to be cut as the heading advances. As regards the maintenance of the drills, packing is the most expensive item; owing to the very high pressure used, stoppages are fairly frequent. In fact, in order to keep nine drills at constant work they have 15 drills in hand.

The number of boring bits actually in stock at the time of my first visit was 2,967, and about 700 a month are worn out. The actual weight in stock amounted to about 10 tons. The wastage, owing to wear and sharpening, amounts to 10 cm., or 8.5 lb., per meter advance of the tunnel. The stock of extension-pieces kept was 315 of 25 cm. length, and 620 of 50 cm., weighing about seven tons. The number of extension pieces scrapped during the month amounted to 180 of 25 cm. and 138 of 50 cm., or just over two tons. This is not an exceptional amount, as the engineer informed me that, since the tunnel started, over 34 m. per month of extension pieces were scrapped, that is 1,540 lb. per month.

So much for the wastage of steel; now for the cost of labor in sharpening. I found at Brigue five milling machines working day and night, cutting teeth on the bits, one automatic machine cutting male screws on the bits and extension pieces and one cutting female screws. Two blacksmiths were setting teeth and one man was hardening, tempering and annealing bits; for, as worn or broken bits came from the tunnel, they had to be softened before going to the milling machines. It is needless to go into figures to prove that a system, which would necessitate the employment of so much skilled labor in simply sharpening the drills from nine machines, is much too expensive to be considered for a single moment.

In order to complete my figures relative to the drill I give an estimate of the cost of an installation of two drills: Three rock drills complete with rack bar, 6 sets extension rods, 100 hollow bits, pipe connections and spares, $4,200; hydraulic power plant: one pair No. II force pumps, to deliver four cu. liters per second; 1 accumulator, 1 high-pressure pipe connection between pumps and accumulator, 1 spur-wheel gearing for pump, $2,200; packing for sea voyage, $200; total, $6,600. This is the price free on rail, Winterthur station, Switzerland.

In addition to the above, provision would have to be made for (1) a filter bed to clean and free from grit all the water to be used on the drills, (2) a 100-h. p. engine to drive the pressure pumps, (3) new high-pressure water-pipes to the working face.

One of the hygienic features of the installation which makes for efficiency is the provision for bathing and washing and drying the clothes of the workers. A laundry, provided with a boiler, washing machine, wringer, a number of concrete washing and rinsing wells and a drying room, is built for their use, and a large building, 120 ft. by 43 ft. by 24 ft. high, steam-heated and lighted by electricity, is the change room. The temperature of this room is kept at from 68° to 75° F. by steam pipes carried about 3 ft. high. The miners' wet clothes are hoisted up to the higher parts of the room by means of pulleys and numbered cords, thus drying them quicker and better than if locked up in a cupboard.

NEW CARBIDE WORKS IN SPAIN.—The Sociedad Espanola de Carburos Metálicos, which is the largest manufacturer of calcium carbide in Spain, will erect a second plant in Corcubion. The new works are to be of 5,000 h. p. capacity, and with the present facilities will turn out sufficient carbide to supply the Spanish markets.

CONSTRUCTION OF WOODEN WATER TANKS.

Water tanks for fire protective purposes, which often do not receive ordinary care and supervision, frequently collapse, sometimes with considerable damage. The fire underwriters have been led, therefore, to study the causes of such collapses and the remedy. Their conclusions are of value in specifying the proper construction for wooden tanks for any purpose.

The most frequent cause of collapse is corrosion of the hoops. The ordinary hoop is a flat wrought-iron band, ⅛ to ¼ in. thick, and of varying widths. They are seldom painted, either before or after putting on, and are subject to corrosion both from the outside and the inside. Outside corrosion is easily observed, but not so the inside corrosion; and the real condition of the hoops is seldom known until collapse occurs. Inside corrosion is due chiefly to moisture, which works into and through the staves of the tanks. Many hoops corrode sufficiently to fall off by their own weight. The only way to determine the condition of flat hoops is to reinforce the tank with additional hoops, and then remove the old ones for examination.

Flat hoops, when properly cared for, will give satisfactory service, but round hoops are much to be preferred. With round hoops, corrosion from the inside acts only on a small surface, as compared to the flat hoop, and ordinary inspection will detect the corrosion before it has progressed sufficiently to weaken the hoop. Round hoops have the further advantage that swelling of the tank is less likely to burst the hoops, since a round hoop will indent itself into the wood.

Hoops should be made of wrought iron of good quality, with tensile strength of not less than 50,000 lb. per sq. in. In determining the size, a factor of safety of 5 or 6 should be used, and allowance should be made for the swelling of the staves, which will strain the hoops more than the actual pressure of the water in the tank. Hoops should never be less than ¾ in. in diameter. They should be made without welds, and should be thoroughly painted before and after erection.

MANGANESE STEEL.—L. Guillet, in *Comptes rendus*, 1903, CXXXVII (12), pp. 480-482, reports that micrographic examination of manganese steels shows their close similarity to nickel steels. Only about one-half the quantity of manganese is required, however, to produce the same effect as nickel. Pearlite steels show great breaking stress and also high resistance to blows. Manganese alone does not render the steel brittle; this happens only when the percentage of carbon and manganese is sufficient to give a martensite structure. Low carbon steels, containing less than 4 or 5 per cent manganese are not at all brittle.

RUBBER FOR CHEMICAL USE.—C. O. Weber, in the *India Rubber Journal*, Vol. XXVI, page 317, states that although no kind of manufactured rubber will resist the action of strong acids for any considerable length of time, low grades of rubber are inferior to Para rubber. The acid-resisting qualities of Para rubber are improved if it be mixed with paraffin wax, ceresin, or paraffin wax treated with sulphur or mineral oil, one part of wax being added to 10 parts of rubber. Manufactured rubber, which is to be exposed to the action of acids, should be free from zinc oxide, whiting, zinc sulphide, lithophone, and any considerable quantities of magnesia or magnesium carbonate. These ingredients, which are commonly employed in the compounding of rubber, are gradually dissolved from the rubber, leaving the latter in a porous state. Instead of them, the mixtures for acid-proof rubber should contain barytes, French chalk, china clay, lead sulphide or lead sulphate. Litharge may be used, but only in small proportion. The durability of rubber intended to be acid-proof is directly proportional to the degree of vulcanization.

SLIMES PROCESS AT THE CONSOLIDATED MERCUR GOLD MINES.

By GEORGE MOORE.

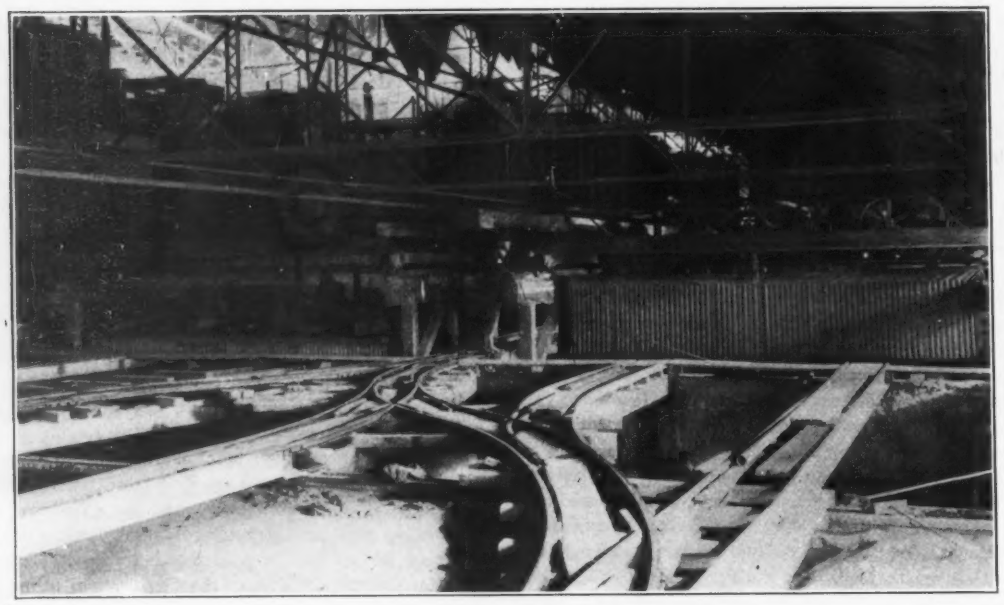
This process was designed by the inventor to meet the slimes difficulty in cyaniding, by which probably 90 per cent of all ores are seriously affected. The methods at present in vogue for the treatment of slimes are by decantation and by the filter-press; at least these methods are the only ones heretofore attempted in a large way. Both of these have objections, especially for low-grade ores. The filter-press method has largely displaced decantation, and is, especially in South Africa and Australasia, very extensively in use. In both of these regions the ores are of sufficient value to stand the cost of operating and the loss by imperfect washing. In this country, most of the larger mines produce ore of such low grade that the use of filter-presses, or of the decantation method, is out of the question.

I had full experience in the operation of filter-presses at the Sunshine mine, where the ore averaged less than $3 per ton, and there encountered the difficulties with which every filter-press operator is familiar—that is, the cost of manipulation and the imperfect washing of the gold solution from the cakes. There were four 3-ton presses, and the labor cost of operating was 60c. per ton of slimes, while an average of 40c. of soluble gold was left in the cakes. The latter difficulty is due to the fact that, in filling, it is impossible to prevent a partial separation of the coarser slime particles from the finer. Thus the resistance to the flow of wash-water varies in different parts of the cake, and the water naturally takes the course of least resistance, and a large part of the cake is not washed. To overcome this difficulty, operators in South Africa resort to double filter-pressing—that is, they stir the cakes from the first press into an emulsion with water, or solution, and repeat the filtering operation. This, of course, doubles the operating cost, already too high.

The accompanying illustrations show some of the Moore process filters in operation at the Consolidated Mercur mill. The filters consist of a series of parallel plates 4 in. apart. Each plate is 20 ft. long and 4 ft. high, and is simply a light frame-work, with canvas on both sides. A suction pipe passes through the top, at the center, down to within 0.5 in. of the bottom, while two blowing pipes also enter at the top, each one half-way between the center and ends, and extend barely through the top. Eighteen of these parallel plates are firmly attached to channel irons crossing their tops, thus forming one 'basket' of filters—that is, one unit. We thus have in one machine a total filtering surface of 2,880 sq. ft. On top of these plates, and connected to their suction pipes by a 3-in. cross header-pipe, rests a 5.5-in. and 8-in. by 7-in. vacuum pump of the Dean pattern. The whole basket hangs by eight wire cables from an electric crane, which raises and lowers the basket, and carries it from one compartment of the tank to another. This tank has three compartments, containing slimes, weak cyanide solution and wash-water. Just beyond the wash-water compartment is the discharge point, simply an open space, under which the tailings cars stand to receive their load.

In operation the filter-basket is lowered in the slimes compartment and the vacuum pump is started. The slimes are agitated to prevent settling. After the suction has proceeded from one to two hours, varying with the character of the slimes and with the thickness of the emulsion, there is a coating of slimes on all parts of the filtering surface of from 0.75 to 1 in. in thickness, representing from 9 to 12 tons of slimes, dry weight. The motor on the crane is then started, and the basket, with its load, is lifted out of the slimes compartment, this operation requiring 40 seconds. The crane is then moved along its track until over the weak cyanide compartment and the basket is lowered. Twenty minutes in this tank, and 10 minutes in the wash-water tank, is sufficient for a complete displacement of the valuable solutions. During all this time the pump is in operation, and the vacuum produced prevents the cakes

from dropping off during the transferring. Having arrived at the discharge point, the vacuum pump is stopped and a blast of air turned ino a pipe connecting with the blowing pipes of each plate. The air passing through the cloth, from within the plates, dislodges the slime cakes, and they drop at once into



SLIMES PLANT, CONSOLIDATED MERCUR MILL.

the cars below, so that from 9 to 12 tons are discharged and loaded in about a minute. Each filter handles about 75 tons per day, and one man operates the four filters, so the cost of labor is about 3c. per ton. The wear on the cloth is almost nothing, cloths in use six months, in the experimental plant, showing no deterioration. The power required is very small; a 75-h. p. motor does the raising of the basket, and is in operation only four minutes during each cycle of two hours. The vacuum pumps are run by air, and hold a vacuum of from 18 to 20 in. of mercury. The discharge solution is as clear as spring water.

The advantages of this system are: First, a saving of from 40 to 60c. per ton in labor; second, a saving of a like amount in extraction; third, a saving of over 50 per cent in the cost of installation. The saving on extraction is due to the fact that, while the filter is in the slimes tank, and the suction in operation, an equalizing action is taking place, rendering all parts of the cake of equal resistance to the flow of solution and wash-water, so that, when placed in the washing tanks, a perfect displacement of solutions is accomplished. For example, we might consider that it would be possible for one spot on the 2,880 sq. ft. of slime-cake to have more of the coarser slimes, or fine sand, than the other parts; then there would be less resistance to the flow at this point; therefore, the flow would be accelerated here, the slimes would be brought up, and would cover this point more rapidly than the other parts, until, by this increased coating, the resistance to the flow would become the same as at all other points. This equalizing influence is, in fact, so continuously in operation that at no instant is there any less resistance to the flow at one point than at all other points. Thus, when lifted out from the slimes compartment, the entire basket of filters is in condition for washing, and, in practice, we extract all of the soluble gold.

At the Consolidated Mercur mill all of the ore is first passed through revolving cylinders, where the slimes are washed from the sands. By this operation the benefit of the sands, as shown in the extraction, fully equals the benefit to the slimes; for, consisting only of the coarse granular particles, percolation is carried on rapidly, while better displacements and washings are accomplished. The tailings from both the sands and the slimes assay from 40 to 45c., a saving of 80c. per ton over the old system. This, on 1,000 tons per day, is a heavy item.

At the Dexter mine, at Tuscarora, Nevada, slimes which had been considered so rebellious that they could not be treated by any existing system are now being handled by this process, the tailings often carrying only 20c. per ton in gold. Experiments carried on in the Black Hills indicate that the slimes there can be treated very rapidly, cakes 0.75 in. thick having been built up in 10 minutes. A 100-ton plant is now being built by the Allis-Chalmers Company for the Big Buxton & Bonanza property, in that district.

THE STATUS OF STEEL BILLETS.

The following remarks on the position of steel billets in the trade, which is not always clearly understood, are from the latest issue of the *Iron Age*, of New York:

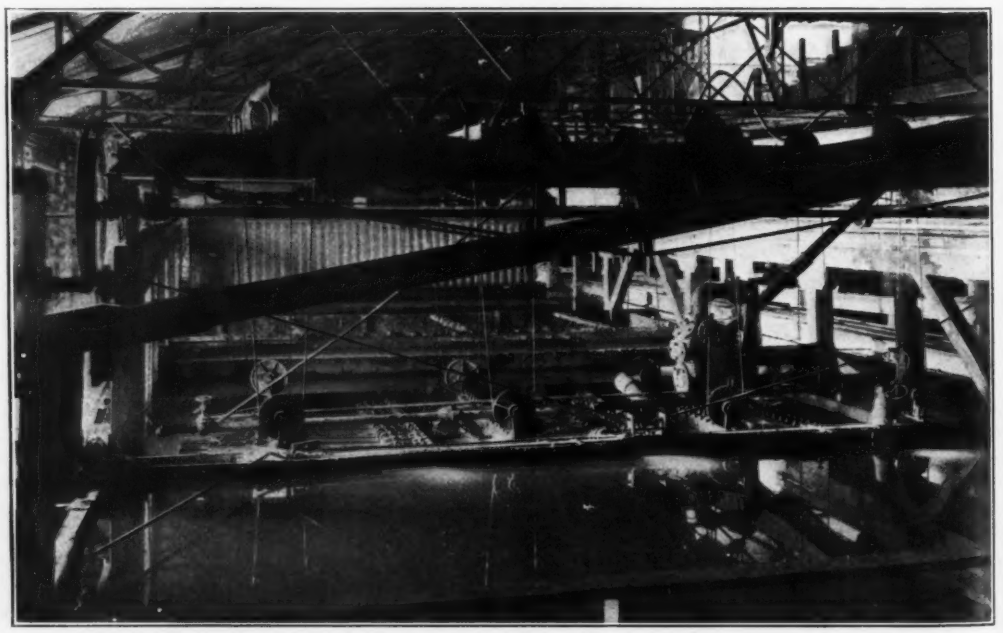
Since the great consolidations in the steel industry the steel billet has ceased to be a very important factor in the markets of this country. At one time enormous quantities were bought and sold, the transactions for a single week often aggregating 100,000 tons. There were dozens of rolling mills, large and small, in all branches of the finished iron industry which depended upon the great steel mills for the whole or a large part of their supply of raw steel in the form of ingots, blooms, billets, slabs or bars. When the series of consolidations took place, two distinct tendencies developed: The one, on the part of the large rolling mills aggregations, to produce their own steel, and the other, on the part of some great steel works, to carry the steel for which the market was threatened to the finished product. The organization of the United States Steel Corporation headed off this movement. The new aggregation inherited many sliding-scale contracts for steel based on fluctuations in the market price of pig iron, that having been a favorite method of tying up large consumers of steel for considerable periods of time.

This enormous business between steel works and rolling mills in the Central West ceased when the contracting parties became constituent companies of one great consolidation and the business in intermediate products shrank to comparatively insignificant proportions.

A good many of the smaller manufacturers of finished iron and steel, feeling threatened in their source of supply of the raw material, turned to the basic open-hearth furnace for relief. A considerable number of independent small steel plants sprang up all over the country, being designed, for the sake of economy of operation, on a somewhat larger scale than the immediate requirements of the finishing mills to be directly served. The plan was to take care of the requirements of other neighboring rolling mills similarly situated as to supply of steel.

When the sudden contraction of the demand came a few months since, these individual open-hearth steel plants had a larger surplus to market, and they sought an outlet vigorously. They have been favored by the rapid decline in the prices of basic open-hearth pig, which became available at $14, delivered, and less, and of melting scrap, which is freely obtainable at $10 and less. Under such conditions, assuming a cost of conversion to be standard, their cost kept pace fairly well with the receding market prices for finished materials, and with a cost of conversion from the average cost of the raw material to the finished billet of $7 to $9, according to local conditions, the old pool billet prices held out a good deal of temptation, while the new schedule has no terrors.

In the billet market of to-day, greatly restricted as it is, the small open-hearth plants play a relatively very much more important rôle, and that fact must be recognized when considering the course of events in the future.



SLIMES PLANT, CONSOLIDATED MERCUR MILL.

EXPLORATION FOR COAL IN HOLLAND.—The Netherlands Government has made an appropriation of 100,000 florins to subsidize exploratory operations for coal along the Belgian frontier in the duchy of Limburg.

ABSTRACTS OF OFFICIAL REPORTS.

Greene Consolidated Copper Company.

This company has issued a preliminary statement, covering the year ending July 31, 1903. The company owns an important copper-producing property in the Cananea district, in Mexico. The balance sheet at the close of the year may be condensed as follows:

Capital stock	$7,200,000
Capital reserves	5,686,079
Current accounts and liabilities	1,404,789
Reserves from revenue, for depreciation, etc.	392,800
Surplus account, balance	70,238
Total liabilities	$14,753,906
Cost of properties	$13,230,987
Current accounts and balances receivable	1,522,919
Total assets	$14,753,906

Of the property account, $8,230,987 is made up of expenditures at Cananea, and $5,000,000 represents cost of the stock of the Cananea Consolidated Copper Company stock. The additions to property expenditures during the year amounted to $1,796,728. The surplus account shows profit for the year, $820,465; deducting debit balance of $318,407 from previous year, left $502,058. Dividends paid amounted to $431,820, leaving a surplus of $70,238, as above.

The total bullion produced at the mines was 43,228,120 lb., containing 42,310,544 lb. copper, 397,425 oz. silver and 1,651 oz. gold. The gross value of this bullion was $5,706,192; from this is to be deducted $740,408 for refining and selling expenses, leaving a balance of $4,965,784 as net proceeds of bullion produced during the year. This sum is made up as follows: Bullion sold and paid for, $3,572,403; cost of bullion in transit and in process of refining, $931,343; estimated profit on bullion in transit, $462,038; total, $4,965,784. Disregarding the gold and silver, and calculating averages on the copper only, would give the following results:

	Amount.	Per lb. copper.
Gross proceeds, as above	$5,706,192	13.49
Miscellaneous receipts	211,558	0.50
Total	$5,917,750	13.99
Cost of producing bullion	$3,192,621	7.55
Refining and selling expenses	740,408	1.75
Depreciation and exhaustion of ores	275,858	0.65
General expenses, interest, etc	426,360	1.01
Total charges	$4,635,247	10.96
Profit, estimated	$1,282,503	3.03

The income account, as stated in the report, is based upon actual sales of bullion only, and gives the following figures:

Bullion sold and paid for	$3,572,403
Stores, rents, lumber, real estate, etc., etc	211,558
Total credits	$3,783,961
Cost of production, deducting cost of bullion in transit	$2,261,278
Depreciation charges	275,858
Administrative expenses	303,447
Interest, discount and exchange	122,913
Total charges	$2,963,496
Actual balance of profit	$820,465

Of the administrative expenses, the general charges at Cananea, including salaries, taxes, police, fire protection, etc., amounted to $171,458; the expenses of the New York office were $131,989. Of the remaining items, Mexican exchange losses amounted to $25,213; the rest including interest and similar charges.

Full details are promised in the complete report, which will be issued later.

Consolidated Gold-Fields of South Africa.

This is one of the finance companies which hold a very large interest in mines in the Transvaal. Its report covers the year ending June 30, 1903, and gives many details as to the different mines in which the company is concerned, including some of the more important operations on the Witwatersrand.

The liabilities include £2,000,000 in ordinary shares, £1,250,000 in preference shares, and £450,000 in debentures bearing 4.5 per cent interest. The company has a reserve of £1,000,000, and the credit balance of its profit and loss account stands at £1,976,949. The investments in property, stocks and other securities stand on the books at £5,816,850. The reserve and cash balance are mainly placed where they are quickly available, apparently, as the balance sheet shows loans at short call amounting to £1,311,365, while the mortgages and cash advances are valued at £360,756. The company's total profit for the year amounted to £472,855, while the office and general expenses were £82,745, leaving a balance of £390,110. The payments from this balance were £75,000 for dividend of 6 per cent on the preference shares, and £14,089 for income and other taxes.

The operations of the company during the year are well summed up in the directors' report, from which some extracts are given below:

"In addition to the realized profit, the company's share investments (apart from any appreciation in value on properties and ventures) show, on current market prices, a further large unrealized profit. The past year has been characterized by sluggish and inactive share markets, eventuating in a serious fall in the market value of South African mining shares of all descriptions. Apart from causes which have no relation to South African or mining affairs, the main reason for the still existing depression remains the shortage of native labor, and until the active steps at present on foot (the outcome of persistent efforts on the part of the leaders of the mining industry) have resulted successfully, the directors feel that it is in the best interests of the company to husband its cash resources. They therefore cannot recommend the payment of a dividend for the year now ended, a policy which they feel confident the shareholders will approve under the abnormal conditions which have prevailed during the year.

"The directors are pleased to state that the policy they have consistently kept before them since it was first enunciated by the late chairman, Mr. H. E. M. Davies, namely, to make this company independent of market fluctuations in regard to its own annual dividends, by means of the dividends on its investments, has, in spite of all existing difficulties, neared partial realization during the past year, and only requires a full complement of native labor to become effective. On a conservative estimate, the dividends accruing to this company only from its holdings in Simmer & Jack, Robinson Deep, and Knights Deep, will in normal times amount to over £400,000, of which the Robinson Deep is already earning profits approximating its estimated contribution to this source of revenue. The Simmer & Jack, fully equipped and with over 1,140,000 tons developed up to September 5, 1903, is waiting to drop its full 320 stamps; and the Knights Deep, after three months' preliminary run on dump and development ore, should show satisfactory profits as soon as a sufficiency of labor enables 100 stamps to be in operation.

"Investments stand in the books at average cost or under, and all shares are taken into account at prices below those current at the date when the accounts were made up. The changes which have taken place in the company's holdings during the past year have not materially affected the general position or the nature of the investments. The amount shown in the balance sheet to credit of reserve, £1,000,000, is invested in British Government securities.

"Though continued progress has been made during the year, the directors regret that, owing principally to the short supply of labor, the present position of the industry is not as satisfactory as they had hoped it would have been by this date, but they are pleased to note that it has improved considerably since the date of the last report. It is important to South Africa generally, that the rate of progress should be assisted by every means in the power of the Home Government as well as by the governments of the South African colonies.

"Between September, 1902, and September, 1903, the number of mines crushing increased from 41 to 62, the number of stamps at work from 2,520 to 4,267, and the monthly output of gold from over 170,800 oz. of fine gold to over 276,000 oz. of fine gold, valued at over £1,170,000. Although the short supply of labor has, in one instance at least, necessitated temporary cessation of work, and in other instances caused suspension of crushing operations, which had been resumed, a considerable amount of development work is being carried on. Increased attention has been paid to the improvement of existing and to the introduction of new labor-saving appliances, and various properties have benefited by improvements in this respect which have been initiated by members of the company's engineering staff. Important reductions which have been made in the cost of explosives will materially assist in reducing working costs.

"The directors are pleased to state that the company's affairs in South Africa continue to be administered by the same efficient staff, to whose energy and ability the progress made in spite of so many difficulties is greatly due. . . .

"Milling operations are being conducted on the Simmer & Jack Proprietary mines, the Robinson Deep Gold Mining Company, and the Knights Deep, the latter company having commenced to crush since the close of the last year. At the date of the last report, 115 stamps were running on the Simmer & Jack; these have been increased from time to time to 150 now in operation, and the output, which in September, 1902, was 7,554 oz. of fine gold, has risen to 9,636 oz. for September, 1903. With its vast installation of 320 stamps and heavy establishment charges, no mine in South Africa probably suffers to the same extent from insufficiency of native labor, and no mine will respond more generously to a full supply. With comparatively low-grade ore, an expensive staff of skilled employees, and one-half of its stamps hung up for want of unskilled labor, a lower cost of production and larger output cannot be hoped for; the great point is to keep development work going *pari passu* with the tonnage crushed, and ore reserves adequate for the full stamping power when it can be brought into play, and it is satisfactory to know that this is being done. Meantime, from the straitened circumstances economies are being learnt and exercised, the financial position of the company is easy, and, believing that the present labor shortage must before long be made good, the board have greater confidence than ever in the prosperous and even brilliant future before this mine.

"The 80 stamps, which were in work on the Robinson Deep at the date of the last report, have been increased to 165, and the output of 5,743 oz. of fine gold in September, 1902, has risen to 13,242 oz. in September, 1903. Working costs have materially decreased, owing principally to the development having exposed large bodies of good ore value in the main reef and leader, and would have fallen to a still lower figure had more favorable labor conditions permitted of the full 200 stamps being in operation. Development has been actively pushed, the ore reserves having increased in greater proportion than the tonnage crushed, and the directors feel justified in expressing favorable anticipations as to the future of the company, which re-entered the dividend list in July last by making a distribution of 10 per cent to the shareholders.

"Crushing on the Knights Deep was commenced in August last with 60 stamps, increased to 75 stamps in September. The results so far cannot be taken as a fair criterion, the ore having mainly been derived from past development work, and some loss and absorption of gold during the first month or two of running a new plant being unavoidable. The successful unwatering of the mine during the past year and the completion of the connection between the two shafts at the 1,200-ft. level are matters that call for special notice. The quantity of water met with in this mine has been unusually heavy, and the sinking of the shafts has been attended with great difficulties. As much as 2,500,000 gal. of water per 24 hours has to be dealt with, necessitating a pumping plant far in excess of what is generally required by mines on the Rand. This heavy flow of water is not altogether a disadvantage, as a considerable

revenue is derived by selling part of it to other mines.

"On the Simmer & Jack East, progress has been continued in development work and shaft-sinking, connection having been established between the two shafts in April last. It was hoped that crushing would have been commenced on the property some months ago, but in this case, as in others, the short labor supply has retarded the necessary work. Crushing on the Nigel Deep was in operation before the war, and the mill and plant are in good condition. Development work has been proceeded with, and it was anticipated that crushing would be resumed in the early part of next year, but labor difficulties, which have been even more acutely felt in this district than on the Witwatersrand, have so seriously increased working costs that it has been deemed advisable to temporarily suspend all operations. Sinking and development work has been resumed on the South Rose Deep, Jupiter, South Nourse and Village Deep, and a considerable amount of construction work on the surface effected. But little has been done on the Simmer & Jack West, South Geldenhuis Deep and Sub-Nigel, except the maintenance of machinery and plant, and in the case of the two latter properties construction work on the surface, including the erection of head-gears. The bore-hole, which is being put down jointly by the Rand Victoria, Rand Victoria East and Rand Mines Deep, and which is located near the Rand Victoria East boundary, has been continued to a depth of 3,913 ft. On the Central Nigel Deep an arrangement has been made on joint account with the Grootfontein Estate to put down a bore-hole on the boundary line between the two properties, which is now down to a depth of 1,198 ft. A bore-hole is being sunk jointly by the Kleinfontein Deep and the Van Ryn Deep, and has attained a depth of about 1,200 ft. No work has been done in connection with the following companies: Turf Mines, South Rand Gold Mining Company, New Vierfontein Gold Mining Company, City Deep, Wolhuter Deep, and the group known as the Klip companies.

"Numerous proposals have during the past year been made to the directors in connection with exploratory work for gold, diamonds, copper and coal. Some of the apparently more promising ventures have been considered, and several expeditions have been dispatched to examine and report. With the exception, however, of certain properties which have been favorably reported on by the engineers, the directors have not acquired any fresh interests of importance.

"The Government has, since the date of the last report, appointed a Water Board, on which the Chamber of Mines has adequate representation. Hydraulic engineers have been appointed whose reports, made on the spot, are understood to give satisfactory evidence of their confidence that sources exist from which, in course of time, all necessary requirements can be drawn. In the meantime further exploratory work has been done by this company in conjunction with others, in order to tap auxiliary sources of supply for the mines. It is hoped that this present work and the recommendations of the Water Board, when made and carried out, will effectually settle the water question on a fair and economical basis.

"The history of the Transvaal War contribution of £30,000,000, which was settled upon on the occasion of the late Colonial Secretary's visit to Johannesburg, is within the knowledge of shareholders. The mining groups having been invited and having agreed to guarantee the subscription of the first £10,000,000 of a loan to be issued for this purpose, the company has taken part in such guarantee to the extent of £1,000,000, up to which amount this company's liability is limited. Under the terms of the guarantee the first instalment of the loan is to be issued at par, bearing 4 per cent interest, whilst any proposed modification of these terms is subject to the consent of the guarantors.

"Notwithstanding the persistent efforts of the Native Labor Association, coupled with a considerable rise in wages and improvement of comforts, the increase of African natives employed by the mines has amounted to only 23,000 odd in twelve months. The total number of 'boys' employed on the mines in July, 1903, was little more than one-half the number at work in July, 1899. The opposition to the suggested employment of Asiatics has been strenuous, and has not been confined to those inhabitants of South Africa who opposed the idea; but it is evident from the reports of meetings of European miners held all along the Rand, and of Europeans interested in, but not engaged on, the mines, that there is a strong consensus of opinion that it is vital to the interests of the Transvaal that an adequate supply of labor from the Asiatic continent should be secured. It is earnestly to be hoped that the report of the Labor Commission will be so convincing as to the inability of South Africa to at present meet the demand, that the British Government may without hesitation forthwith sanction the introduction of legislation enabling the engagement of Chinese laborers. As regards coolie labor from British India, it is to be deplored that the Transvaal and Home governments have not as yet been able to satisfy the requirements of the Governor-General-in-Council. Seeing that Natal finds employment for some 60,000 Indian coolies, it seems certain that the obstacles hitherto presented to their introduction into the Transvaal must be shortly surmounted.

"The condition of affairs in Rhodesia shows some improvement during the last twelve months, and fresh discoveries have been made of gold, copper and coal. The copper properties, in which this company is interested, give promise of results insuring a permanent industry. The extension of railways in various directions has received careful attention from the British South Africa Company, but at present high rates tend to hamper the extension of mining and trade development. It is to the interest of the British South Africa Company to assist in effecting a material reduction in these rates with a view to rendering remunerative the large amount of capital invested in the country by land, trading and mining companies, and it is hoped that action in this direction will shortly be initiated. The labor question has been a serious one in some districts, although in others a severe drought has resulted temporarily in increasing the native labor available. It seems doubtful if the available supply of local African labor will be found sufficient to meet requirements. The difficulties of wagon transport, always great, have been increased by the prevalence of the cattle disease known as 'red-water,' for which the general manager reports that there are great hopes that a remedy has been found. The output of gold has increased from 15,164 oz. in September, 1902, to 18,741 oz. in September, 1903. A 10-stamp battery has been erected on the Morven, and crushing was commenced in April last. In addition to the difficulties from which all Rhodesia has suffered this year, which have affected the progress of this company, the mill has not worked as efficiently as was anticipated, but the general manager reports hopefully of an immediate improvement in the output. Negotiations are now in progress for the acquisition of an adjacent property, the developments on which, in the opinion of the consulting engineer, justify the battery being increased to 20 stamps. On the Killarney Hibernia, development work has been carried on with satisfactory results. Mr. Piper, the consulting engineer, is of the opinion that present developments warrant the erection of a 20-stamp battery, and that it is possible the property may prove to be a 30-stamp proposition.

"Work has been carried on upon several of the properties acquired by the Consolidated African Copper Trust, of which at the present time the Alaska, the Umkondo, the Silver Reef and the Edmundian, appear the most promising. It is anticipated that regular shipments may shortly be made from the latter property. Additional copper claims have been acquired north of the Zambesi, and two coal areas have been marked out in the Victoria district. Most of the properties are favorably situated with regard to railways.

"The company still retains its interest in the New Gold Coast Agency, a company whose objects have been set forth in previous reports. The flotation of two subsidiary prospecting companies, namely, the Adjah Bippo Deep and the Cinnamon Bippo Company, was alluded to in last year's report, and although work has been temporarily stopped on the Adjah Bippo Deep, pending the result of operations on the property of the Wassau (Gold Coast) Mining Company, considerable developments have taken place on outcrop claims of the Cinnamon Bippo during the last twelve months, and the results obtained are of a sufficiently encouraging character to justify further expenditure on development and exploitation, which will be vigorously prosecuted on the Cinnamon Bippo properties and on others in which the New Gold Coast Agency is interested. Among these may be mentioned blocks of claims on the Horton's Abosso and Huni River concessions, on which work will shortly be commenced.

"As regards the criticism offered last year by Mr. MacLeod on (1) the system pursued by the directors as regards the flotation of sub-companies, and (2) the system of disposing of working capital shares of such sub-companies accruing to the Consolidated Gold-Fields, a lengthy correspondence has since taken place between the board and an influential committee of shareholders, entitled the Scottish Committee. The correspondence brought about an interview at Glasgow between the chairman and Mr. Christopherson and the said committee, at which Lord Harris stated that, as regards all flotations during the last four years, the idea that any considerable quantity of working capital shares accruing to the company had been parted with was an erroneous one. The chairman also repeated the assurance he had given to the shareholders at the last annual meeting that, when a suitable opportunity occurred, the board had no objection to making an offer to the shareholders of such shares as were at their disposal."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

The Twentieth Century Engineer. By Victor C. Alderson. Golden, Colo.; the Colorado School of Mines. Pamphlet, 10 pages.

Report of the Commissioner of Education for the Year 1902. Volume I. Washington: Government Printing Office. Pages, 1,176.

Jahrbuch für das Berg- und Huttenwessen im Königreiche Sachsen. Compiled by C. Menzel. Freiberg, Germany: Craz & Gerlach. Pages, 544.

Ankylostomiasis. Its Cause, Treatment and Prevention. London, England: the *Colliery Guardian* Company, Ltd. Pages, 32; illustrated.

Twenty-first Annual Coal Report of the Illinois Bureau of Labor Statistics, 1902. David C. Ross, Secretary of Board. Springfield, Ill.; State Printers. Pages, 396.

Arizona Diatomite. By William P. Blake. Reprinted for the Author from the *Transactions* of the Wisconsin Academy of Sciences, Arts and Letters. Pamphlet, 4 pages and 4 plates.

Canada. Maps of the Territories of Alberta, Assiniboia and Saskatchewan. Ottawa, Canada; issued by the Department of the Interior, Clifford Sifton, Minister. Three maps, each 39 by 19 inches.

American Association for the Advancement of Science. Proceedings of the Fifty-second Meetin. 1903. L. O. Howard, Permanent Secretary. Washington: Published by the Association. Pages, 394.

Die Mineralkohlen Oesterreichs. Compiled and prepared by the Committee Allgemeinen Bergmannstages. Vienna, Austria; published by the Zentralverein der Bergwerksbesitzer Oesterreichs. Volume I, 492 pages text; Volume II, 12 plates and maps.

BOOKS REVIEWED.

Tangential Water-Wheel Efficiencies. A Paper read before the Pacific Coast Electric Transmission Association. By George J. Henry, Jr. Pages, 43; with illustrations.

This paper summarizes the results of a series of experiments, undertaken by the author, for the purpose of determining the relative efficiencies of different styles of water-wheel buckets. The conclusions arrived at differ from those obtained by theoretical means alone, and it is believed that they will prove of practical value in showing how the best results can be had from water-wheel plants. The pamphlet is illustrated with drawings of the various shapes of buckets now manufactured showing the behavior of each under the various conditions of work.

The Journal of the Iron and Steel Institute. Volume LXII. Edited by Bennett H. Brough, Secretary. London, 1903: E. & F. N. Spon, Ltd. New York: Spon & Chamberlain. Pages, 648; illustrated.

The *Journal* of the Iron and Steel Institute occupies a high place among publications of its kind, and it is so well known as to need no introduction to our readers. The present volume relates to the second half of the year 1902, and is devoted in part to a record of the meeting of the Institute at Düsseldorf, giving in full the papers which were presented to the society at that time and the ensuing discussions by the members. It is impossible, within the limits of this review, to do more than summarize the leading features of the volume. One of the most valuable papers, entitled 'The Progress and Manufacture of Pig Iron Since 1880,' is contributed by W. Brügmann. It is a study of the progress of the German iron industry in the last 20 years, and contains much valuable information relating to the commercial and technological development of iron in that country. This paper is supplemented by 'Progress in Steel Works Practice Since 1880,' written by R. M. Daelen. Among the other important contributions may be mentioned the following: 'Iron and Steel at the Düsseldorf Exhibition, 1902,' by Dr. Hermann Wedding; 'The Overheating of Mild Steel,' by E. Heyn; 'The Compression of Steel by Wire-Drawing During Solidification in the Ingot-mould,' by H. Harmet: 'The Application of Electric Power in the Iron and Steel Industries,' by E. Selby-Bigge; 'The Use of Electricity in Iron and Steel Works,' by F. Kylberg; and 'Probable Existence of a New Carbide of Iron,' by E. D. Campbell and M. D. Kennedy. As usual, the volume contains a very full review of the literature relating to the iron and steel industry, together with detailed statistics of the production of iron and steel, coal, coke and other mineral products in various countries.

Geological Survey of Georgia. Bulletin No. 9. A Preliminary Report on a Part of the Granites and Gneisses of Georgia. By Thomas L. Watson. Atlanta, Ga.: State Printer. Pages, 367; with maps and illustrations.

This excellent work embodies the results of a study of the granites and gneisses found in the northern part of Georgia. Owing to the rapid increase in the production of these building-stones within the last few years, a demand was felt for a thorough survey and examination of the resources of the State. To satisfy this demand, the Geological Survey has prepared the present report, which discusses the principal granite localities in the Piedmont area of Georgia. Outside of this region there are many areas of granite and gneiss as large as those herein mentioned, and it is proposed by the Survey to make these the subject of future investigation. The present report is divided into six chapters. Chapter 1 discusses the physical and chemical properties, varieties, geological age, occurrence, history and uses of granite in general. Chapter 2 treats of the general physical and chemical properties of building-stones and their relative values for specific purposes, with special reference to granite. In chapter 3 is described the general geology and physiography of the Piedmont region, so far as it falls within the boundaries of Georgia. A list of the individual properties, with details regarding the occurrence and chemical and mineralogical composition of the rock in various localities, is included. Chapter 4 shows the chemical composition of the different varieties of granite in the State, and summarizes the facts regarding their lithological characteristics and correlation. Chapter 5 is a study of the general principles underlying the phenomena of rock weathering. It describes the changes and processes involved in passing from the fresh, unaltered rock to the weathered residual materials. Chapter 6 includes a number of statistical tables, showing the production and value of the granite production in the State for several years, and the different purposes for which the product was used. There are also tables giving the physical and crushing tests of granite and gneiss from various sections, as well as a long series of chemical analyses. While referring more especially to the granites of Georgia, the report contains a great deal of information that is of general value. The volume has been carefully prepared, and is very creditable to its author, and to the Survey, which is doing excellent work in the field, and in making known the economic geology of Georgia.

The Gas Engine. A Treatise on the Internal-Combustion Engine, Using Gas, Gasoline, Kerosene, Alcohol, or Other Hydro-carbon as Source of Energy. By F. R. Hutton. New York: John Wiley & Sons. London: Chapman & Hall, Ltd. Pages, 502; illustrated. Price, $5.

The works heretofore published on the internal-combustion engine have been chiefly either English or German. In the English language, the best-known volumes are those of Robinson, Clerk and Donkin, and they have been mainly concerned with the development of this type of engine in Europe, and with the forms and types chiefly in use in Great Britain. Professor Hutton has made his book especially American in plan and treatment. He has summed up the records of past work briefly in an historical chapter at the end of the book; while in the main part he selects for illustration and criticism the modern American forms which are typical and suggestive.

In his preface the author says: "When a previous treatise by the author was published, under the title of 'The Mechanical Engineering of Power Plants,' it was suggested by one of his most gifted critics that the title should be amended, because the book did not cover the power-plant practice which uses gas engines. The point was well taken, but the omission was intentional. To have included the gas engine, would have made that book inconveniently bulky. Furthermore, the treatment of the gas engine must be essentially different from that given to the steam engine, and at that time the state of the art, both practically and scientifically, did not admit of the preparation of a satisfactory and exhaustive discussion. Since that time, however, there has grown up a largely increased appreciation of the fuel value of what were called the waste gases from the blast-furnace, and a wider extension of the manufacture of fuel-gas in producers. The gas engine has been extensively applied in the departments of electric lighting, and of compression, both of air and gas. It is since that time, also, that there has appeared the exacting demand for motors for self-propelled vehicles, and for small launches, so that it has become possible to undertake that for which the time was not ripe when the criticism was made. There was, at that time, little distinctively American practice to be studied, but the principal work had been done in England, Germany and Belgium. The introduction by Daimler of the high-speed gas engine, and the immediate development which this class of motor received in France for motor-vehicle use, has greatly stimulated the work upon this class of machine in all departments. Furthermore, the development of the carbureter, and the recognition of the significance of carburation, as a process in the handling of liquid fuels, enormously widened the scope and field for the internal combustion motor. In fact, in the opinion of the writer, the development of this particular detail draws a broad line of distinction between the former and present practice which marks in effect the epoch of the development of the art."

The first three chapters are introductory, reviewing the physical properties of the hydro-carbons for power purposes and the necessary preliminary definitions and constants to be used in discussions of internal-combustion engines. There is much which is new on gasoline, kerosene and alcohol for power purposes. This leads naturally to the treatment of the succession of events which will appear when a gas or liquid fuel imparts to air the increase of its energy due to combustion, and that energy is exercised upon an engine piston. This succession of events as respects heat, pressure and volume, is known as a 'cycle,' and the mixture of fuel and air will pass through its cycle, provided the fuel energy is properly supplied, whether the motor operates with gas or with gasoline, with kerosene or with alcohol. A chapter is given to each kind of engine, those on gasoline automobile motors and on kerosene and alcohol engines being entirely new, since they have only becomes possible since the automobile motor has called for the development of these types.

The problem of the internal-combustion engine is also a novel one for the motive-power student by reason of the demand for a device whereby the proper proportions of fuel and air shall be introduced into the motor cylinder under all variations of load, and in the motor car under all variations of speed. This requirement has resulted in the creation of the appliance called a 'carbureter,' and here, in the tenth chapter, is brought together an analysis of the systems in use and a description of typical forms. Similarly, there are chapters treating the problem of igniting the charge of fuel and air for the working stroke of the engine, and the requirement of governing the effort of the piston as the load varies. These are both original in their completeness and scope.

An entire chapter is devoted to the manipulation of the gas and gasoline engine, the detection of the defects which cause improper working, and the problem of starting the motor after a stop. The methods of testing gas engines for their performance and economy also receive full discussion, and a form of log is given for the data of such tests. A very complete tabulation of performance of engines with various fuels will also be found of exceptional value for comparison and for record.

Perhaps, however, the most noteworthy chapter for the student and expert is that which gives an exhaustive mathematical analysis of the behavior of the heat liberated in a gas engine or its derivatives when operated under the usual cycles. The cycles are compared with respect to temperature, pressure and volume for a given addition of heat, and they are compared with respect to efficiency. Graphical solutions are also given, with a view to enabling the deductions to be used in calculating the mean effective pressure, and from it the required cylinder size for a certain horse-power. Some attention is paid to the problem of heating air at constant pressure, with a view to the use of a gas turbine as a motor, and some valuable data on the behavior of explosive mixtures of gas and air are collated. An historical summary and brief bibliography conclude the treatise.

Professor Hutton has given us a book which is, upon the whole, a very satisfactory one, and which supplies the need for a thorough treatment of the internal-combustion engine, which is now assuming so important a place among power producers.

MANUFACTURE OF ZINC WHITE IN THE ELECTRIC FURNACE.—B. H. Thwaite and T. J. Denny, in British Patent 18,015, August 16, 1902, propose to heat granulated zinc in an electric furnace through which a current of air is forced. The zinc is thus burned. The oxide produced is conveyed through a suitable canal into a settling chamber.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Wire-rope Tramways.

SIR.—In a recent issue of the ENGINEERING AND MINING JOURNAL the Denver agent of a tramway company made a lengthy comment upon the paper on 'Aerial Tramways,' which I read before the Deadwood meeting of the American Mining Congress. Had he read the paper in its entirety, instead of in abstracted form, as he states, he might have ascertained the fact that I purposely refrained from entering into a detailed discussion of any particular tramway manufactured in this country. Papers read before such gatherings as the Deadwood meeting must necessarily be brief, else those in attendance lose interest therein. The comparatively limited time at my disposal prevented the delivery of an extended address, so that the theme of my paper had to be rather an argument in favor of the use of tramways in general, than a detailed description of any individual plant.

This will also account for my giving only approximate figures for the cost of erection, machinery, etc., without investigating why they were high or low; only illustrating how the different conditions influence the prices to a certain degree.

The reason I did not name the source from which I got my figures is very evident. The dignity of the platform and my own good taste forbade me to create even the shadow of an impression that I would take advantage of the opportunity to speak for a particular firm under the disguise of scientific discussion. I represented at the same time the Broderick & Bascom Rope Company, of St. Louis; yet there was not even a hint, in my paper, of that fact. Some of the figures I quoted were really from the Camp Bird line; yet, had I desired to make it an object of my paper to describe a single line of the Bleichert system, I could have found more instructive and important ones for that purpose erected by the German concern, Leipzig-Gohlis, A. Bleichert & Co., with whom I worked for years as their representing engineer.

I appreciate highly the ardor for business that gentleman displays, but I think he goes too far in calling all other tramway systems "cheap imitations." While, in my paper, I paid a high tribute (naturally, not mentioning names) to the Bleichert system, which I consider a very good one, I could not deny the merits of other systems. Neither could I see why they should be barred the right of existence and appreciation. One who not only sold tramways, but also worked on them for years, will know that failures are not so much due to inferiority of material—as no concern with common sense would sin against its good reputation by using inferior material when it can get first-class quality just as easily as its competitors—as, for instance, to impractical adaption of the system to local conditions by incompetent engineers with only theoretic knowledge about tramway erection. Then, of course, failure is liable to occur, even with the best system; my critic knows that.

Then, again, automatic systems are apt to deliver materials in the reverse direction, even without stopping the tramway. On my inspecting tour in Colorado I saw, on the Sunnyside tramway, provisions, such as meat, logs, and fuel, carried in that way up to the mine sufficient to supply over 400 miners. This is one of many double-rope tramways built by some other concern in Colorado. Some of them have quite heavy capacity, work very satisfactorily, and are mute protests against the statement that "in Colorado all double-rope tramways have been constructed by the pioneer company."

STEPHEN DE ZOMBORY.

St. Louis, Mo., Nov. 21, 1903.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

COMPUTING EXPENSES AND PROFITS IN MINING.—Where a mining lease provided for the payment of $500 additional out of the first six months' profits, in computing such profits, the expenses at a period prior to the commencement of the six months period cannot be deducted from the earnings of that period. Such payment must be made out of the second six months, if the first six months are not profitable.—Laing v. Holmes (93 Missouri Appellate Court *Reporter,* 231); Appellate Court of Missouri.

OWNERSHIP OF ORES UNDER LAW OF MISSOURI.—Ores dug by a lessee under a mining lease belong to the owner of the fee, and not the lessee, unless it is otherwise especially provided in the lease. Hence, where a lessee transferred certain ore by an oral agreement to another, who never took possession of same, and the lessee assigned his lease to C., who subsequently sold the ore in the bin to another, both C. and such other having notice of the previous transaction, the purchaser's title was good, and trover could not be maintained for the value of the ore.—Arnold v. Bennett (92 Missouri Appellate Court *Reporter,* 156); Appellate Court of Missouri.

WHEN WORK IS DONE ON SEVERAL MINES, LIEN MAY BE CLAIMED GENERALLY.—In Idaho, where work is done upon two or more mining claims owned by the same person, the only effect of failing to specify the amount due on each claim, is to postpone such lien to other liens filed against them; and where such claims are known under one name, and the description in the claim of lien so describes them, with a location of said mines, it is sufficient. The provisions of a lien law must be liberally construed to effect their object.— Phillips v. Salmon River Mining & Development Company (*72 Pacific Reporter,* 886); Supreme Court of Idaho.

THERE CAN BE NO LOCATION ON PUBLIC LANDS TILL AFTER DISCOVERY.—The law of the United States (United States *Compendium,* 1901, p. 1424) relating to the location of mining claims on public lands of the United States, provides that no location shall be made until discovery of a vein or lode within the limits of the claim located; therefore, one who had entered on a vacant 20-acre tract, and had begun prospecting shafts, but had made no discovery, could not enjoin a trespass on the tract, unless he alleges that such trespass is on the ground surrounding his shafts, or that part in which he was in actual occupancy of. The fact that he had posted notices would not enlarge his rights.—Gemmel v. Swain (*72 Pacific Reporter,* 662); Supreme Court of Montana.

EXTRALATERAL RIGHTS OF SURFACE OWNER IN LODE MINING CLAIMS.—The extralateral right of the owner of a lode mining claim extends to a portion of the lode between his end-line planes produced, although it is completely severed from that portion lying within the boundaries of the claim by the extralateral right of the owner of an older claim, located on the same lode, whose end-line planes extended intersect both those of the newer claims, and his possession of the surface of his claim is possession of such detached portion of the lode, and is the possession of the lode to the full extent of the extralateral right of the owner of the claim.—Empire State-Idaho Mining & Development Company v. Bunker Hill & Sullivan Mining & Concentrating Company (121 *Federal Reporter,* 973); United States Circuit Court of Appeals.

CONSTRUCTION OF OPTION CONTRACT TO DELIVER PIG IRON.—If an executory contract to deliver "two or three hundred tons" of pig iron is an option contract, the buyer loses his right to require delivery of 300 tons unless he exercises his option within the six months in which, by the terms of the contract, it was to be performed. Delay in delivering the first specific amount called for by the contract does not extend the time in which the option may be exercised. And where the delivery was to be 25 tons in November "and balance as ordered within the next six months," the seller sufficiently complied with his contract by delivering 200 tons.—Farquahar Company v. New River Mineral Company (82 New York *Supplemental Reporter,* 241); Supreme Court of New York.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.: preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Small Matte Smelting Furnaces.—Can you inform me how long a 36-in. circular water-jacket furnace has been known to run without stoppage, producing a matte assaying upward of 55 per cent copper?—V. S. C.

Answer.—We do not know what is the record for a furnace operating under the conditions stated. It would be only a matter of curiosity, anyway. Smelting furnaces are operated to make money; not for records. In any campaign, the time comes, sooner or later, when it is cheaper to blow out and start over again than to keep the furnace in operation, although the latter may be done. The length of campaign will depend upon the conditions of operation, especially the character of ore smelted, the type of slag that is produced, the ratio of matte concentration, etc. It is extremely difficult to run a furnace so small as 36 in. for any great length of time on an ore that requires a difficult slag to be made, especially if the matte-fall is also to be low. Short campaigns under such conditions are in no way metallurgically discreditable. There may be more money in keeping a furnace in blast for only one month, and then overhauling and beginning again, than to aim at a longer campaign. This is a matter which must be settled in every case by the showing of the ledger.

Pig Iron Grades.—In comparing the analyses and fractures of different brands of pig iron, I have been unable to determine the difference between bessemer, malleable and ordinary foundry; I might also say basic iron. Sometimes foundry iron runs pretty high in sulphur, and sometimes in phosphorus, but I have seen lots of different brands in which no difference could be detected by analysis, the appearance of fracture or action in the cupola. I would thank you very much if you would furnish me with the following information: What gives these brands their particular names? What are the specifications for the various brands? Why is there a difference in price and what is the average difference? What are the differences in blast furnace practice between the various brands?—C. M. S.

Answer.—With regard to the first part of your question, it may be said that while the different grades of iron sometimes approach each other in quality, so that there is no very marked difference between the specimens, there is a practical difference which is clearly recognized by the makers and users of iron. As to the names, those given to the various grades practically explain themselves. Bessemer is, of course, an iron adapted for use in making steel by the bessemer process; in the same way, basic is used for making steel by the basic converter, or open-hearth process; foundry is used for making castings; gray forge for puddling. These uses, of course, are not exclusive; thus, while foundry iron could not be

used for making bessemer steel; it is quite possible to use bessemer iron for making castings, and in fact it is often so used, either alone or in a mixture for special work.

The difference in prices is caused by the varying demand. There is no regular average difference, and it varies according to circumstances; bessemer generally brings the best price, with basic next; foundry iron is usually somewhat lower, although there have been times when foundry commanded very nearly the same price as basic pig. Gray forge is usually the lowest in price.

As to the specifications for the different brands, we give the following, which is taken mainly from West's 'Foundry Practice' and 'Cast Iron.' Foundry iron is usually made with coke or anthracite; silicon ranges from 1 per cent upward, sulphur, 0.01 to 0.05; manganese, from a trace to 1.5; phosphorus, from 0.20 to 1.50. The special brand of foundry iron known in the market as southern soft is high in silicon, and is used in foundry mixtures to give a fluid iron, which will fill the corners of the mold. Bessemer is an iron running low in sulphur, with silicon from 0.75 to 2.50; manganese not over 1 per cent., and phosphorus below 0.10. The requirement for phosphorus is rigid; if the proportion of phosphorus should exceed 0.10, the iron is called off-bessemer and is used for foundry purposes generally.

Basic iron must be low in sulphur, not exceeding 0.05, and may range as high as 2.5 in phosphorus; it should be low in silicon, but may carry some manganese.

Gray forge ranges from 0.5 to 8 in silicon and may have up to 0.2 in sulphur. The proportion of phosphorus in forge iron varies. The pig should have a gray fracture, with little or no grain. Gray forge is used chiefly for puddling, but also, to some extent, as a mixture with foundry iron for the manufacture of certain kinds of castings. There are also what is known as white and mottled, which is generally hard, running rather high in sulphur and in phosphorus and very high in carbon. These irons bring comparatively low prices, being hard and brittle. They are generally the off-product of a furnace which has not worked very well.

The making of the different kinds of iron depends upon the ores used chiefly, the fuel, and some other points, which it would be impossible to give here at length. The ore is the most important point, and next this comes the use of a good coke; something also depends upon the proper working of the furnace, the use of a due proportion of flux, the proper regulation of the blast, and other matters.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending November 24, 1903.

744,720. PROCESS OF DESULPHURIZING SULPHUR-BEARING PETROLEUM.—Theodore F. Colin, Elizabeth. N. J. A process of desulphurizing petroleum and its distillates, which consists in treating them with an aqueous solution of iron sulphate, sodium chloride and copper sulphate.

744,761. FILTER-PRESS.—Alfred James, London, England. In a washing filter-press, a series of alternating filtering-plates, frame-plates and washing-plates, with suitable filtering-cloths, having continuous passages at top on one side in said plates for the admission of the liquid to be filtered and the washing liquid respectively, the first-named passage communicating with the frame-plate cavities only, the last-named passage communicating with the washing-plates only, a continuous efflux-passage at top on the opposite side communicating with the washing-plates only, and outlet-orifices on the filtering-plates at bottom, diagonally opposite to the filter ports or passages.

744,759. MACHINE FOR RECOVERING MERCURY AND AMALGAM FROM ORES.—Thomas H. Hicks, Fort Wayne, Ind., assignor to the Hicks Gold and Silver Extraction Company. A reciprocating pan having an amalgamated lining and adapted to contain ore and water; amalgamated joints in said lining for the passage of superfluous mercury and means to agitate the ore.

744,765. PROCESS OF MAKING ALUMINA AND BY-PRODUCTS.—Lucius R. Keogh, Pembroke, Canada, assignor of one-third to Noah Joseph Gareau, Pembroke, Canada. A process for the manufacture of alumina and by-products, consisting in mixing sulphate of aluminum with sodium chloride and some water, to form a thick pulp, then heating the latter to a temperature of from 200° to 300° C. and simultaneously passing steam into the pulp to form a mixture of alumina and sodium sulphate and to evolve hydrochloric acid with the steam, and finally separating the alumina and sodium sulphate.

744,795. PROCESS OF EXTRACTING MATTER FROM LIQUIDS BY SOLVENTS.—Louis C. Reese, London, England. A process of continuously extracting matter from liquids by solvents, which consists in intimately mixing the liquid to be treated with vapors of the solvent which are partly condensed thereby, the liquid to be treated getting hot and the matter to be obtained being extracted therefrom by the likewise hot condensed solvent, in passing the hot mixture of the solution in solvent of the extracted matter and of the liquid under treatment into solvent consisting of the solution of the extracted matter and of fresh solvent having only served for washing the treated liquid, in separating the produced solution in solvent of the extracted matter from the treated liquid by means of their different specific gravities, in washing the latter liquid with fresh solvent and in evaporating the solvent in which the extracted matter has been dissolved.

744,805. PEAT DIGGING OR EXCAVATING MACHINE.—Carl Schlickeysen, Steglitz, near Berlin, Germany. The combination, with an endless chain, and means for moving the same, of digging and excavating tools attached to said chain consisting of knives arranged side by side, and a shovel located behind said knives.

744,823. CONCENTRATING APPARATUS.—Greenleaf R. Tucker, Boston, Mass., and George W. Goddard, Concord, N. H., assignors of one-third to Edward S. Beach, Boston, Mass. In concentrating apparatus the combination of a closed casing, a gas-inlet port and a gas-outlet port with a receptacle, within the casing, for liquid material to be concentrated; a device for continuously removing from the receptacle into the chamber of the casing sheet-like portions of said liquid material; means for creating and maintaining a current of gas through the casing; means for removing concentrated material from said removing device; means for flushing the side walls of the casing, and means for returning the flushing material into the receptacle.

744,871. FURNACE FOR HEATING ASPHALT, ETC.—Antonin Montupet, Paris, France. A rotary heating vessel for asphalt and other materials provided with inward projections in its cylindrical wall for increasing the heating surface thereof, said projections forming in the vessel ledges and agitating devices for the material treated, toothed extremities to the projections, a draw-off orifice for the material and scrapers for the external surface of the vessel.

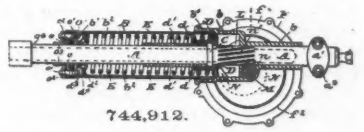
744,872. MINE-CAR.—William H. Morris, Johnstown, Pa. In a mine-car, a floor-plate, sides secured thereto, said floor-plate being longer than said sides, thus forming extensions at both ends of said car; bumpers mounted on said extensions, heavy angle members secured to the lower corners of the car-body for bracing said extensions, a front end and an end gate suitably connected to the sides aforesaid.

744,873. BORING TUBE OR ROD FOR BORING APPARATUS.—Alexander McNamara and John Schanke, Johannesburg, Transvaal. In a boring-rod for boring apparatus, the combination with the rod of a sealed or air-tight tube arranged inside the rod for the purpose of buoying same.

744,874. COOLING-BED FOR METAL BARS OR RODS.—Marvin A. Neeland, Youngstown, Ohio, assignor to Morgan Construction Company, Worcester, Mass. In a cooling-bed for metal bars, or rods, the combination of the following instrumentalities: Means for severing the bar into desired lengths, means for assembling the several lengths into groups of parallel bars, means for moving the bars in a group simultaneously by an endwise movement, means for checking the endwise movement of a group at a desired point, and means for moving the bars in the group by a sidewise movement.

744,908. COMPOUND FOR PROMOTING COMBUSTION IN COAL.—George M. Dallas, Chicago, Ill., assignor to Ezra S. Booth, Chicago. A compound for promoting combustion of coal, consisting of a mixture of 245 parts by weight of air-slaked lime, 17 parts by weight charcoal, 25 parts by weight common salt, 2 parts by weight soda ash, 2 parts by weight sulphate of zinc, 5 parts by weight of paraffin-wax and 5 parts by weight of brimstone, all combined.

744,912. ELECTRICAL ROCK-DRILL OR ROCK-DRILLING MACHINE.—Arthur H. Gibson, near Krugersdorp, Transvaal. In a rock-drill or rock-drilling machine, in combination, a drill-bar, a collar or annular projection formed thereon, a circular tappet or disk mounted concentrically on the bar and free to rotate thereon and bearing against one side of the collar, the boss of the tappet and the bearing-sleeve screwed into the boss so as to reciprocate the drill-bar as the tappet is moved in a path parallel to the longitudinal axis of the bar while permitting it to



744,912.

revolve freely, the spiral spring arranged concentrically around the drill-bar and bearing against the tappet at one end, and the ball-bearing collar interposed between the other end of the spring and the drill-case.

744,916. FLUID-COMPRESSOR VALVE.—Fred. D. Holdsworth, Claremont, N. H., assignor to Sullivan Machine Company, Chicago, Ill. In a fluid-compressor, the combination with a valve, of mechanism for moving the same, and yielding means which is both compressible and extensible secured to both said valve and its moving mechanism and forming a connection therebetween, whereby said valve is positively but yieldingly moved in both directions and is governed by the difference in pressure on its faces and irrespective of the position of the moving mechanism.

744,920. PROCESS OF MANUFACTURING HYDRATES OF ALKALIES AND ALKALI EARTHS.—Fredrik Jahn, Ridley Park, Pa., assignor to Harrison Bros. & Co., Incorporated, Philadelphia, Pa. A process of obtaining hydrates of alkalies and alkaline earths, which consists in subjecting the sulphides thereof, in aqueous solution, to electrolytic action in the presence of an extended porous anode mass of material whose sulphide is physically and chemically resistant to the action of the residual electrolyte.

744,979. CONVEYOR-BELT AND FASTENER THEREFOR.—Andrew Rasmussen, Racine, Wis., assignor of one-half to H. F. Herrick, Racine, Wis. A device for fastening a slat to a conveyor band or belt, comprising a staple adapted to extend through said band and slat, and having a wide central or connecting part which engages the belt, a plate adapted to fit upon the outer face of the slat over which the free ends of the staple are designed to be folded, and lugs bent downwardly from the opposing margins of the plate and adapted to fit upon the side faces of said slat.

744,992. ROASTING-FURNACE ATTACHMENT.—Drury D. Bailey and James O. Bailey, Banner, Cal. The combination in an ore-roasting apparatus of a furnace having an inclined discharge flue, a pipe extending substantially central through said flue and through the furnace, a device for feeding ore through said pipe, an extension of the pipe beyond the furnace, and an amalgamating device carried upon the discharge end of the pipe.

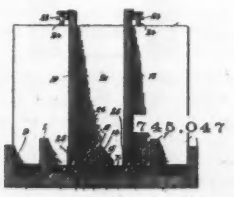
744,997. PLASTIC COMPOSITION.—Rosa H. Boyd, Seattle, Wash. A composition of matter comprising wood-pulp, flour, Egyptian lacquer, liquid silicate and water.

745,031. DEVICE FOR OPERATING TRIPPERS FOR BELT CONVEYORS.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl & Patterson, Pittsburg. In a tripper for belt conveyors, the combination of an endless traveling belt, a tripper-frame engaged by said belt, and mechanism for imparting an intermittent movement to said tripper-frame.

745,032. DEVICE FOR OPERATING TRIPPERS FOR BELT CONVEYORS.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl & Patterson, Pittsburg Pa. In a tripper for belt conveyors, the combination of a traveling endless cable, a tripper-frame connected thereto, and mechanism for reversing the direction of travel of said cable.

745,038. ORE-DOCK.—Edward C. Carter, Evanston, Ill. In an ore-dock, the combination of a pocket having an inclined bottom and a discharge-opening, door mechanism closing the same so as to prevent or permit the discharge of material, and a discharge-chute pivotally connected to the dock adjacent to and underneath the door mechanism of a width substantially equal to that of the ore-pocket and narrowing in width from the point of reception to the point of discharge.

745,047. AMALGAMATOR.—George Fletcher, Charles E. Davis and Benjamin T. Douglass, St. Clair, Nev. An amalgamator comprising a casing having a quicksilver-pit



745,047

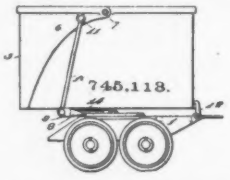
and a pressure-chamber directly over said pit, vertical amalgamating-plates disposed in pairs at opposite sides of the pressure-chamber and each plate extending below the quicksilver-level in the pit, the plates of each pair being disposed in parallel relation and forming an intermediate

space in which auriferous material is free to distribute itself after passing one plate and before passing the remaining plate of the pier, and a beveled divider extending upwardly from the bottom of the pressure-chamber and between the adjacent members of the pairs of plates.

745,067. CALCINING APPARATUS.—Ambrose Lawrence, Acme, Tex. A calcining apparatus, consisting of a furnace, a pan arranged in the furnace and having its bottom inclined from its ends downwardly to the center, said pan being provided with a gate-controlled outlet opening in one side at its center, and with a pipe leading from its top, an air-pipe extending into the furnace beneath the pan, branch pipes leading from said pipe into opposite ends of the pan at one side thereof, said branch pipes extending along the bottom of the pan to about the center thereof and having their inner ends closed, and a series of perforated tubes projecting from each branch pipe and extending to the opposite side of the pan, said tubes having their ends closed.

745,075. CORRUGATED LINING FOR PULVERIZERS.—Joseph M. Schutz, Minneapolis, Minn., assignor to the Schutz-O'Neill Company, Minneapolis, Minn. A pulverizer or grinding-mill of the class described comprising a cylindrical casing, in combination with a corrugated ring or lining provided therein and having internal inclined corrugations, said ring being shorter than said casing, a shaft, beaters provided thereon, a disk carried by said shaft and located between the end of said ring and the end of the casing, a return-duct, a feed-trunk, a separator-cone and end disk.

745,113. ORE-CAR.—George G. Newcomb, Denver, Colo. The combination with a rotatably mounted support of a car-body pivoted thereto, formed with a discharge-opening, a



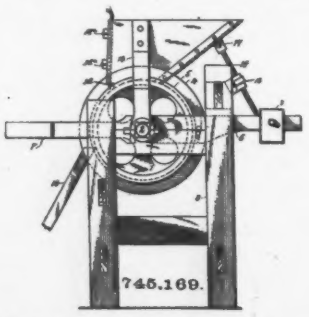
gate closing said opening, webs formed on said gate inclosing a portion of said body and pivotally engaging the same, and a link connecting said rotatably mounted support with one of said webs.

745,122. REDUCTION OF METALS AND ALLOYS.—Frank J. Tone, Niagara Falls, N. Y. A method of reducing from their oxygen compounds, metals whose temperatures of reduction and volatilization are nearly the same, which consists in subjecting such oxygen compounds, admixed with carbon, to heat in an incandescent furnace, keeping the temperature of the charge below the limits at which volatilization occurs, and removing the reduced metal from the zone of maximum temperature as fast as it is formed.

745,137. EXCAVATOR.—Edward J. Beard, Kansas City, Mo. In an excavator, a frame, a jointed arm, its outer end carrying a shovel, the shovel being arranged to be placed at the level of the bottom of the cut by the deflection of the outer end of the arm, and to be thrust forward by the straightening of the arm, the arm being pivotally connected to the main body of the excavator and arranged to act as a chute to discharge the excavated material when the shovel is raised beyond the angle of friction.

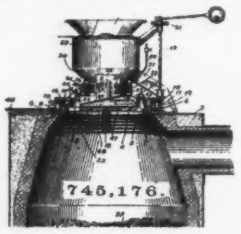
745,147. BOILER COMPOUNDS.—James I. Broughton, Walkerville, Mont. A boiler compound consisting of potatoes, linseed-meal, tallow and black oil.

745,169. FEED-REGULATOR FOR ORE-FEEDERS.—Charles Z. Ellis, Berkeley, Cal., assignor of one-half to Robert C. Lane, Berkeley, Cal. In an ore-feeder, a frame, a cylinder mounted to rotate in the frame, annular flanges



at the ends of the cylinder, cylindrical ledges at the outer sides of the flanges, levers mounted to rock at opposite ends of the cylinder, blocks carried by the levers and extended across the cylindrical ledges, the sides of the blocks adjacent to the ledges being inclined upward and outward, a series of bearing-balls arranged between the blocks and ledges, the said balls being of varying dimensions, and a hopper arranged above the cylinder.

745,176. GAS-PRODUCER.—Jerome R. George, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. In a gas-producer, having an opening in its top communicating with the combustion-chamber, a feeding device comprising a rotating coal-distributing pan placed over said opening and a stationary coal-reservoir placed above said pan and communicating therewith, said coal-distributing pan having an unobstructed passage therethrough, and



having an opening at its lower end eccentric to its axis of rotation for the delivery of coal to the combustion-chamber, and an opening at its upper end for the reception of coal from said reservoir, a coal-supporting bottom whereon coal is held at an angle of repose while the coal-distributing pan is at rest, and means for rotating said pan.

745,181. CENTRIFUGAL PUMP.—Elmo G. Harris, Philadelphia, Pa. In a pump, the combination with a propeller-wheel, of a casing having a plurality of discharge-passages circumferentially disposed around the wheel and adjustable as to their cross-sectional area.

745,183. DUMPING-CONVEYOR.—Francis Head, Philadelphia, Pa. The combination in an elevator, of a carrier, means for raising and lowering the same, a standard on the carrier, a bucket movably supported on the standard, and means for tipping the bucket to discharge the contents at a predetermined point in the path of motion of said carrier.

745,224. METHOD OF PRODUCING ROUGHENED WIRE NAILS.—Ephraim S. Morton, Brockton, Mass. A method of producing rough-surfaced wire nails, the same consisting in roughening the metallic surfaces of the nails, applying to the roughened surfaces a paste composed of a mixture of material capable of being dissipated by heat, and powdered relatively refractory material, removing a part of said mixture by heat, and roughening the residuum.

745,242. ACID-VAT.—Thomas W. Ruffner, McKeesport, Pa. An acid-vat comprising recessed bottom timbers provided with an interlocking connection upon one side wall thereof, side and end timbers adapted to enter said recesses at their lower ends and provided upon their inner face with an interlocking connection, holding strips extending within said recesses parallel to and throughout the length of the outer faces of the side and end timbers to be accessible for adjustment from the exterior of the vat, interlocking joints between the inner faces of side timbers and the abutting ends of the end timbers, and a removable strip extending vertically parallel to said joints upon the outer face of the end timbers.

745,246. MEANS OR APPARATUS FOR MOLDING METAL TUBES.—Max Sensenschmidt, Frankfort-on-the-Main, Germany. In a machine of the class described, the combination of a revoluble sleeve, bearings therefor, a head carried thereby, tool-carrying arms pivotally connected to said head, springs to move said arms outwardly, a shifting ring connected to and movable longitudinally on said arms, to move them inwardly against the tension of said spring, a lever, and connections between it and the shifting ring, whereby the latter may be operated by the lever.

745,248. LIMEKILN.—Saul W. Shoop, Front Royal, Va. A limekiln, the walls whereof are formed of masonry and tapered inwardly from the outer corners thereof to their centers and tie-rods extending straight through said masonry walls from one corner to the other.

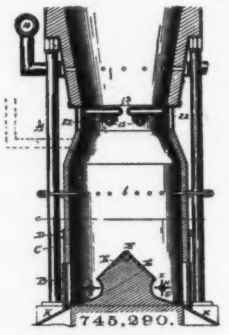
745,249. LIMEKILN-DOOR.—Saul W. Shoop, Front Royal, Va. A limekiln-door comprising a cast-metal plate having a box-like flange on its inner surface, a lining of heat-resisting material mounted within said box-like flange and brace-flanges on its outer surface.

745,252. METAL-TRANSFERRING APPARATUS.—Edwin E. Slick, Pittsburg, Pa. The combination with a support having separated members, of a traveling carriage having dogs arranged to transfer the metal from the members to the carriage.

745,253. CONVEYING APPARATUS.—George W. Smith, Krug, Md. A conveying apparatus comprising a hoist, a derrick pivotally supported upon the end thereof, and having a boom pivotally secured thereto, a head-sheave at the top of said derrick, a tail-sheave mounted on a suitable support, a carriage, a tail-rope passing from said hoist through said head and tail sheaves and supporting midway thereof said carriage, and secured at its end to the carriage, and a head-rope secured to the carriage and to the hoist.

745,255. CORRUGATING-PRESS.—James P. Sneddon, Barberton, Ohio, assignor to the Stirling Company, Chicago, Ill. In a press for shaping metal articles, the combination with the dies and mechanism for actuating the same, of a support or runway in line with the dies, supporting means for said runway arranged to adjust the same vertically and to hold the same in any position between its upper and lower limits of adjustment, and a pusher arranged to reciprocate longitudinally of said runway.

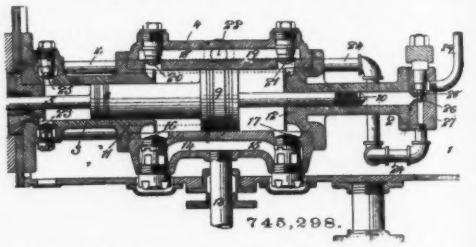
745,290. APPARATUS FOR THE MANUFACTURE OF COKE.—Paul Naef, New York, N. Y. A coking apparatus consisting of an upper chamber independently supported,



for coking the fuel, a lower chamber for treating the resultant coke, with steam and water, a hollow ring between said chambers and doors within said ring.

745,291. APPARATUS FOR MANUFACTURING CEMENT PIPES OR THE LIKE.—Bruno Nöldner, Breslau, Germany, assignor of one-half to Max Kohl, Breslau, Germany. In an apparatus for manufacturing cement pipes, the combination of an outer casing, an inner core, one of said parts being rotatable, and a pressing-piece having the shape of a conical screw carried by the rotatable part, the said pressing-piece having a curved pressing-surface which has a gradually-varying diameter.

745,298. COMPRESSOR FOR AIR OR OTHER AERIFORM BODIES.—Henry C. Sergeant, Westfield, N. J., and Ward Raymond, Easton, Pa., assignors to the Ingersoll-Sergeant Drill Company, New York, N. Y.



A compressor comprising a high-pressure cylinder, an intermediate-pressure cylinder and a low-pressure cylinder placed between the two and in alignment therewith, pistons for the three cylinders connected to move together and means for operating the pistons.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

GREAT BRITAIN.

Week ending November 7, 1903.

26,127 of 1902. SAFETY CATCH FOR MINE HAULAGE.—E. H. Bennett, Pontypool. An improved device for gripping the guide rope of mine cars when the hauling rope breaks.

27,543 of 1902. SODIUM ALLOYS.—P. L. Hulin, Clavaux, France. A method of injecting metallic sodium, in fine downward jets, into molten metal, for making uniform sodium alloys, or for refining purposes.

28,181 of 1902. BLAST-FURNACE CHARGER.—O. Briede, Dusseldorf, Germany. Apparatus for regulating the movements of the charging cone of a blast-furnace top.

4,345 of 1903. REFINING PIG IRON.—A. Zenzes, Chemnitz, Saxony. Making cast iron of high tensile strength, by producing a white iron in a converter, and then adding twice as much pig iron rich in silicon, the resulting metal being lower in carbon than usual.

17,183 of 1903. UTILIZING BLAST-FURNACE DUST.—H. S. Steinberg, Bochum, Germany. Mixing blast furnace dust with slag rich in lime, and forming the mixture into briquettes for re-treatment.

18,213 of 1903. STIRRER FOR ROASTING FURNACES.—W. Kaufmann, Köln, Germany. Arranging the stirring arms, or rabbles, for roasting furnaces in such a way that they can readily be placed and that the ware is reduced.

18,454 of 1903. BRAZING COPPER ON IRON.—J. D. Prince and H. S. Rodgers, New York, U. S. A. A system or method for brazing plates of copper, or brass, and ingots of iron.

18,480 of 1903. WELDING ALUMINUM AND STEEL.—Compound Metals Company, Ltd., London. Process for welding aluminum and steel together.

19,167 of 1903. TREATING ARMOR PLATES.—C. P. E. Schneider, Creusot, France. A method of locally softening steel armor plates, so as to allow cutting and drilling tools to operate on them.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. Ralph Baggaley, of Pittsburg, is at Butte City, Montana.

Mr. Charles Humphrey has returned to New York, from Cuba.

Mr. Henry Wolcott has returned to New York, from Colorado.

Mr. F. G. Farish and Mr. C. W. Purington are at Cananea, Mexico.

Mr. R. A. F. Penrose has gone west to Denver and thence to Arizona.

Mr. George A. Packard is at Baker City, Ore., on professional work.

Mr. George Tilly is on his way from London to Tolima, in Colombia.

Mr. J. Felix Brandes, of Denver, is in New York City for several weeks.

Mr. H. S. Anderson has resigned as superintendent of the Shannon Copper Co.

Mr. F. J. M. Rhodes is in New York, having recently returned from Mexico.

Mr. Henry C. Banon, of Kalgoorlie, is visiting at Colorado Springs, Colorado.

Mr. A. Stanley Elmore will return to London by the *Etruria*, sailing on December 5.

Mr. E. Henry Davies has left London to go to Hungary on professional business.

Mr. Paul Couldrey is manager of the Le Roi No. 2 mine, at Rossland, British Columbia.

Mr. Thomas Symington, of Glasgow, sailed on December 1, by the *Kronprinz Wilhelm*.

Mr. Juan Felix Brandes, of Denver, Colo., is now in New York on professional business.

Dr. F. W. Harrell, manager of the La Fortuna mine, in Mexico, is visiting New York.

Mr. T. W. Osterheld has returned to the city of Mexico after visiting New York on business.

Mr. Henry C. Callahan, of San Francisco, is inspecting metallurgical processes in Colorado.

Mr. Robert Young, of Tacoma, Wash., has been examining mining property at Atlin City, Alaska.

Mr. John C. Scantlebury, of the Sydney *Bulletin*, is visiting our mining regions and is now at Denver.

Mr. E. I. Fields has been appointed manager of the United Elkhorn mines, near Baker City, Oregon.

Mr. W. M. Steele, of the Department of Lands and Mines, British Guiana, is taking a vacation in England.

Mr. Geo. J. Bancroft is making an examination of Stratton's Independence mine at Cripple Creek, Colorado.

Mr. J. B. Jacquet, of the geological survey of New South Wales, has been appointed chief inspector of mines.

Mr. E. R. Bush, of Ricketts & Banks, New York City, is in Calaveras county, Cal., on professional business.

Mr. W. M. Johnston has returned to Chicago, after several months in Venezuela and Bolivia, South America.

Mr. Richard Eames, Jr., of Salisbury, N. C., has been visiting New York on his way home from a trip to Mexico.

Mr. John Seward, manager of the Mohave Gold Mining Co., near Needles, Cal., is visiting at Orange, New Jersey.

Mr. Pierre Bouëry, manager of La Grange Hydraulic Gold Co., of California, has returned from Paris, France.

Mr. Don H. Bacon, president of the Tennessee Coal, Iron & Railroad Co., spent several days in New York recently.

Mr. F. L. Ransome, of the United States Geological Survey, has returned to Washington, from Cripple Creek, Colorado.

Mr. A. A. Blow is at Sydney, N. S. W., directing the operations of the Smelting & Refining Co., of Australia, at Dapto.

Mr. John D. Irving, of the United States Geological Survey, has been appointed professor of geology at Lehigh University.

Mr. H. A. Keller, of San Francisco, is consulting engineer to Mr. Benjamin Guggenheim, formerly at 52 William street, New York.

Mr. Edgar A. Ashcroft arrived from London by the *Cedric* and will visit the mining districts of the West and those of British Columbia.

Mr. Newton Dunyon, formerly superintendent, has been appointed general manager of the Daly-Judge mine and mill at Park City, Utah.

Mr. Austin King, of Philadelphia, has been appointed superintendent of the Dominion Coal Co., vice C. P. Ludwig, at Sydney, Australia.

Mr. Henry P. Dickinson has been appointed consulting engineer for the American Gold Mining Co. and Eagle Mining & Improvement Co., of Chicago.

Mr. E. A. Weinberg, late manager of the Smelting Company of Australia, has opened an office as consulting engineer at 20 Copthall avenue, London, E. C.

Mr. William B. Mucklow has resigned the presidency of the Majestic Copper Mining & Smelting Co., operating in Utah. He is succeeded by Mr. A. H. Loomis.

Mr. Edwin O. Daue is engineer to the La Leonesa Mining Co., at Matagalpa, Nicaragua. He has recently been associated with Mr. Philip Argall, at Denver.

Mr. Gustave A. Overstrom has been for some time at Graigmont, Ontario, superintending the erection of a concentrating plant for the Canada Corundum Company.

Mr. Carlos P. Halter, recently from Zacatecas, Mex., has been appointed superintendent of the Las Vigas mine, near Coyame, Chihuahua, to be effective December 1.

Mr. E. H. Garthwaite, consulting engineer to the British South Africa Co., is now at Cape Town on account of ill health. He is likely to proceed from there to London.

Mr. Richard Hamilton, manager of the Great Boulder Proprietary and other large mines at Kalgoorlie, Western Australia, sailed December 1 on the *Kronprinz Wilhelm* en route to London.

Mr. Hiram W. Hixon has left the Mond Nickel Co. and been appointed metallurgist to the Tezuitlan Copper Co., of Pueblo, Mex. He sailed on December 3 for Vera Cruz on his way to the mines.

Mr. F. C. Roberts, consulting engineer to the Rhodesia Mining & Finance Co., expects to leave Rhodesia for the United States early next year, when he will open an office with Mr. H. T. Durant.

Mr. Graham Fraser, managing director of the Nova Scotia Steel & Coal Co., at Sydney, C. B., has been appointed manager of the Dominion Iron & Steel Co. Mr. Fraser will retain his connection with the former company as consulting engineer.

Mr. Winthrop W. Fisk, of Boston, is, for the winter, at Choix, Sinaloa, Mexico, where he has been examining copper properties in the Reformer district for Boston parties; and has also made an examination of the San Geronimo placer mine near Mordas, Chihuahua.

OBITUARY.

Dr. Charles Schäffer, a prominent scientist of Philadelphia, died November 23, of heart disease, aged 66 years. Dr. Schäffer graduated from the Medical School of the University of Pennsylvania and was interested in the natural sciences and their applications. He took an active part in the management of the Academy of Natural Sciences, and was a member of many scientific societies.

John Dwight, prominently known as the pioneer manufacturer of bicarbonate of soda in this country, died, November 25, at his residence in New York City, aged 85 years. He was born at South Hadley, Mass., and educated at the Hopkins Academy. In 1846 Mr. Dwight, with Dr. Austin Church, formed the firm of John Dwight & Co., and began the manufacture of bicarbonate of soda. Several years ago the corporation changed its name to the Church & Dwight Co., Mr. Dwight being made president, a position he held until his death. Mr. Dwight was one of the first directors of the Board of Trade and Transportation, for 30 years a trustee of the American Seamen's Friend Society and an Elder in the Presbyterian Church. He also founded the Dwight School at Erwin, Tenn. His benefactions included the Hampton Normal and Agricultural Institute, the Art Memorial building, to Mount Holyoke College; the Goodwin Memorial and a library building to the town of Hadley. He was a member of the Harlem Club and of the Metropolitan Museum of Art.

SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN CHEMICAL SOCIETY, LEHIGH VALLEY SECTION.—The members met in the lecture room of Gayley Laboratory at Lafayette College, Easton, on Wednesday evening, November 19, Prof. Joseph W. Richards, of Lehigh University, presiding. The officers elected for the ensuing year are: Porter W. Shimer, Easton, chairman; Walter S. Landis, Lehigh University, secretary, and Richard K. Meade, Easton, representative of the section on the council of the society. The following papers were read and discussed: 'Compressed Strength of Cement,' by Prof. Mansfield Merriman; 'On Cement Testing,' Ernest B. McCready; 'Fuel Efficiency of the Rotary Kiln,' Prof. Joseph W. Richards; 'The Fallacy of the Tests Ordinarily Applied to Portland Cement,' Richard K. Meade; 'Geology of the Cement Belt in Lehigh and Northampton counties, Pennsylvania," Prof. F. B. Peck. The meeting was one of the most successful ever held by the section, the cement industries of the valley being very fully represented.

INDUSTRIAL.

The Wisconsin Mining & Milling Co., operating near Sandpoint, Ida., has placed an order with the Ingersoll-Sergeant Drill Co. for a 4-drill compressor and a 50 h. p. boiler.

The Mine and Smelter Supply Co. of Denver filed an amendment to its charter increasing its capital stock from $50,000 to $600,000. The majority of the stock is held by Eben Smith.

The Minneapolis Steel & Machinery Co. has been awarded the contract for the structural steel for the new smelter buildings being erected by the Utah Consolidated Co. This order calls for over 700 tons of structural steel.

The Colorado Iron Works Co. is erecting a smelting plant near Basin, Mont., for the Cataract Copper Mining Co. Mr. J. P. Evans, of the former company, was recently on the ground, looking after the construction work.

The French interests of the General Electric Co. of New York have secured a contract for the construction of a large hydraulic power plant at Thilieres, on the River Dordogne, in the vicinity of Monleydier. The power will be transmitted to Bordeaux.

The board of directors of the Allis-Chalmers Co., at a recent meeting, elected John B. Allen, of Chicago, a vice-president and general manager of the company, making him the active and responsible manager in charge of manufacturing, selling and general operations.

The N. & G. Taylor Co. is completing a number of improvements to its works at Philadelphia and at Cumberland, Md. At Philadelphia, warehouses, storage rooms, box factory and a blacksmith shop are being added. At Cumberland the new open hearth furnaces are completed and running, together with the new gas-producing equipment, consisting of four Forter Miller producers in addition to the old capacity. A new warehouse has been completed in the sheet steel department, and new annealing furnaces are being built in the black plate department. The company recently furnished its Columbia brand of tin for covering a number of the buildings of the Louisiana Purchase Exposition.

The Mexico Mine & Smelter Supply Co., of Mexico City, closely affiliated with the Mine & Smelter Supply Co., of New York, has secured a large contract for a cyanide plant to be shipped to La Paz. Orders have also been received recently for mining machinery for installation in El Oro mines, for steam hoisting equipment for the Colon y Nigromante Co., of Tlalpujahua, and for pumping machinery for the Santa Rosa Co. Boilers, hoisting engines and sinking pumps have been ordered by the Amistad, Bessie and Aguila companies; for the Presa Nueva, Victoria y Anexas, and Progreso companies large pumps have been ordered. Similar machinery will be installed in the Avino mines at Avino, State of Durango.

Contracts for part of the equipment of the coal and coking plant to be built at Coleman, Alberta, Canada, for the International Coal & Coke Co. have been awarded. The Phoenix Iron Works, Meadville, Pa., will furnish two 400 h. p. engines. The Clifford Capell Fan Co., Jeanette, will furnish the mine fan, to give 150,000 cu. ft. of free air per minute. The chain car hauls and picking tables will be furnished by the Link-Belt Machinery Co., Chicago. Stillwell-Bierce & Smith-Vaile feed pumps and heaters will be used. The Westinghouse Electrical & Manufacturing Co. is to furnish the electrical equipment. Work has been started on the construction of the works, which are to be in operation by May, and about 400 coke ovens will be put in as a starter.

The sale of the Pittsburg Coal Co.'s land for $32,000,000 to a corporation which would be virtually the agent of the Pennsylvania Railroad it is stated has failed at the moment when its final ratification seemed assured. The deal was blocked by the executive committee of the Pennsylvania Railroad, which disproved of a proposition to loan the credit of the Pennsylvania Railroad to the intermediate corporation by guaranteeing the $32,000,000 of 4 % bonds, which were to have been issued in payment for the land. The scheme as originally planned was a vast consolidation of western Pennsylvania soft coal properties, the tonnage from which should go to the Pennsylvania Railroad or its allies. A new company was to have been formed, the men behind it being Pennsylvania Railroad interests. This company was to buy the coal lands of the Pittsburg Coal Co. and lease the lands back to the coal company.

The B. F. Sturtevant Co., whose plant at Jamaica Plain, Mass., was burned in 1901, has built a new plant at Hyde Park, about nine miles from Boston. The plant comprises a 4-story office building, 45 ft. by 125 ft.; a three-story building 80 ft. by 500 ft. devoted to the manufacture of blowers, heaters and galvanized iron work; a building 80 ft. by 250 ft. of the same height, on the first floor of which all engines will be tested, stored and shipped, while the other floors will be utilized by the electrical department; a general machine shop measuring 120 ft. by 500 ft., with 40 ft. side galleries devoted principally to the building of engines; a forge shop 40 ft. by 100 ft.; a two-story building of the same floor area devoted exclusively to lockers, washing and sanitary facilities for the employees; a pattern and storage building 80 ft. by 150 ft. in ground plan; a foundry measuring 170 ft. by 350 ft.; a power house 80 ft. square, with detached fire and service pump house. All told, the aggregate floor area of the buildings exceeds nine acres. Brick has been used for all walls; steel columns and girders form part of the construction of such buildings as are equipped with traveling cranes. The equipment is excellent and a large part of it was built by the company itself.

TRADE CATALOGUES.

The Gunckel patent cable haulage machinery, manufactured by the Macomber & Whyte Rope Co., of Chicago, Ill., is described in a pocket size catalogue recently issued. This system, it is stated, is entirely automatic in its operations, and so constructed as to obviate the necessity for mules or gripmen.

The Peerless Electric Co., of Warren, O., devotes bulletin No. 12 to a description of a few special motors. It is a 4-page folder containing illustrations of a few of the types used in small work.

A novel 78-page catalogue has been issued by the Allis-Chalmers Co., of Chicago, Ill., giving a partial list of its foreign engine users. It is a pocket size edition and profusely illustrated with excellent cuts of the many styles of engines manufactured by the company and in use in many countries of the world.

The J. H. Clark Co., of Portage, Wis., in a 20-page booklet recently issued, describes the Clark fuel saver, the invention of James H. Clark, of Portage, Wis. The booklet contains, among other things, testimonials from various engineers verifying claims of merit made by the company for the fuel saver. Figures on a number of tests are also given.

The Fort Wayne Electric Works, of Fort Wayne, Ind., describes in bulletin No. 1050, type MPL, direct-connected generators. The generators are made in two styles. In the small sizes the frame is split horizontally, while the large machines are split vertically. The upper half of the horizontally split frame is not too heavy to be handled with ordinary station cranes. The lamination of the armature core reduces the production of eddy currents. The horizontally split generators are equipped with marble blocks, carrying terminal and equalizer connectors suitably placed for conduit or overhead connection to circuit. The last few pages of the bulletin are devoted to the classification of the styles of the MPL generator, giving approximate weights, dimensions and other data.

The pneumatic tool department of the Ingersoll-Sergeant Drill Co., of New York City, in a neat 32-page catalogue, describes Haeseler axial valve hammers, which are said to embrace features of marked improvement over other pneumatic hammers. These features, it is explained, are the valve mechanism for reciprocating the piston, a locking device for taking up wear and locking the handle, a valve box and cylinder of the tool together, and a simple arrangement of throttle valve for controlling the admission of the air supply. The long stroke riveting hammers are made in three sizes, being 18, 20 and 21 in. in length over all, with a piston stroke respectively of 6, 8 and 9 in., and weighing in the order named 18, 20 and 22 lb. These hammers are also made in styles suitable for chipping, caulking, scaling and flue beading, ranging from 12 to 16 in. in length and from 9 to 13 lb. in weight.

SPECIAL CORRESPONDENCE.

Denver. Nov. 28.

(From Our Special Correspondent.)

The chief feature of the past week in Colorado has been the outbreak of Mollie Maguirism at Cripple Creek, in the blowing up of the shaft of the Vindicator mine, November 21, by means of an infernal machine, resulting in the deaths of Superintendent McCormick and shift boss Beck, who were descending the shaft in the cage at the time. The evidence goes to show that the machine was automatic and carefully contrived. A number of members of the local Miners' Union were arrested and the authorities believe that the guilty parties are among the prisoners. About the same time a man was arrested in the act of removing the spikes on one of the local railroads, a short time before a trainload of passengers, mostly non-union miners, was due to pass over the place. Had the mischief not been discovered in time, very serious loss of life would probably have resulted, as the train would have been precipitated down a steep declivity.

A number of the Colorado National Guard arrived in Cripple Creek about the time of the above events to replace the military force which had been on duty there for many weeks. It was the intention to send the seasoned soldiers from Cripple Creek to Telluride and replace them at Cripple Creek with new troops, but under the circumstances of the outrages both the military force already in the district and the new arrivals were held there. Public sentiment was so bitter against the prisoners regarded as implicated in the fatal explosion in the Vindicator mine, it was not thought desirable that the prisoners should be handed over by the military to the civil authorties, as a lynching might have ensued. They are therefore still in the military guard-house, while the train wrecker was secretly conveyed to the State penitentiary at Canon City, for safe keeping, as a matter of precaution.

It is semi-officially stated evidence exists that it was intended to blow up several other mines besides the Vindicator. The officer in command at Cripple Creek asks Governor Peabody for additional troops, declaring that conditions there demand a larger force to preserve life and property. With very few exceptions all the mines in the district are running, practically with full force and it is conjectured that the recent crimes evidence the chagrin of the Mollie Maguires at the obvious failure of the strike.

The coroner's jury on the Vindicator tragedy contained two strikers and a third man who is a strong union sympathizer and opposed to the Citizen's Alliance. Notwithstanding every witness who expressed an opinion declared positively that he believed an infernal machine was exploded in the mine, the jury in their verdict did not even venture a suggestion as to the cause of the explosion. As showing public opinion, the local lodge of Elks, of which Superintendent McCormick was a member, on learning the verdict, by unanimous vote authorized a reward of $500 for information that may lead to the arrest and conviction of the "murderers" of McCormick.

On November 24 a detachment of 420 officers and men of the Colorado National Guard arrived in San Miguel county and were quartered at different points to guard the mines, the power and light lines and the water supply. They were heartily welcomed by the law-abiding citizens, who constitute the great majority of the community. On the next day the secretary and six other agitators of the Telluride Miners' Union were arrested by the sheriff and his deputies upon warrants charging them with disturbance, threats and intimidation. The armed pickets of the Miners' Union, on arrival of the military, abandoned their posts along the trails to the mines, where they had been intercepting men willing to work. St. John, the former president of the Telluride Miners' Union, is a fugitive from justice, indicted for murder and incitement of riots. On the 26th Miller, the present president of the Telluride Miners' Union, was arrested as he was talking to the imprisoned union agitators through the windows of the jail. He was subsequently released. It is said that the Tomboy Co. is increasing its force and that other local mining companies will resume as soon as the Tomboy has a full complement of men. Owing to the exodus of miners from this district, which has taken place since the strike began many weeks ago, it is said that miners are being obtained from Montana, Michigan and Missouri.

Gen. John C. Bates, of the United States Army, who has been investigating the labor situation in Colorado under instructions from President Roosevelt, after visiting Cripple Creek and Telluride, is reported to have said that Governor Peabody could have done nothing less than call out the militia, and that he called them out just in time. He also thinks the State is in a condition to handle the matter without the assistance of Federal soldiers.

As to the coal strike, in the southern field, while many of the miners have left for the coal-fields in other States and others remain idle at the expense of the fund provided for them by the United Mine Workers, there is still considerable coal being mined; in fact, the steadily increasing output shows that the strike in that part of the State is doomed to failure. It is possible that State troops may be sent there to protect the men who are willing to work.

Governor Peabody says that troops will be furnished to any coal mine wanting to open, if it is apparent that troops are needed. He also says: "It is time for demagogues to cease their work"; that he will protect any man who wants to go to work and to furnish mine owners what protection they need.

In the northern coal-field the strike has been settled as originally planned.

San Francisco. Nov. 26.

(From Our Special Correspondent.)

The South Eureka mine, at Sutter creek, is the latest of the more important mines to be tied up by a strike. It seems that in one shaft compartment a cable broke and dropped the skip into the sump, but no one was hurt, and repairs were made. When the men went to work they saw some kinks in the cable, and suspecting danger, a few men quit work. They were told to go down the other compartment on the north skip, but then some misunderstanding occurred and two men complained to the foreman and were discharged. All the other miners were pledged to stand by the two men, and they all quit. Most of the men did not speak English, and the two men were interpreters. The mine is now closed and 70 men are out of work. The mine has not been paying, being in a development stage, and it is not likely it will start up again for some time. The Black Oak mine, at Soulsbyville, Tuolumne county, also remains closed on account of the miners' strike at that place.

The heavy rains of the past week have caused some hundreds of mines throughout the State, which have been idle for some months, to start up again. This refers not only to hydraulic, but to quartz mines, which have been short of water since the early fall months. The storm was widespread and reached all mining points in the mountains. Hundreds of men who have been out of employment are now at work again.

The owners of the great borax mines at Death Valley, in the desert region, are about to give up the picturesque 24-mule teams used in hauling the borax out to the railroad, and are constructing an automobile train and macadamizing a 100-mile road. The automobile is expected to haul seven loaded wagons or trucks, specially constructed for the purpose.

The Keystone mine, in Amador county, the oldest quartz mine in California, which has been worked for over 50 years, yielded a pocket the other day valued at between $15,000 and $20,000. The North Star mine at Grass Valley, Nevada county, a few weeks ago, found a rich place in its regular ledge and took out over $30,000 from 2.5 tons of the ore. A prospector named Howard found a $3,000 nugget in a claim at Happy Camp, Siskiyou county, the other day. As these things happened in the regular course of mining operations, no fuss was made about them, though had they happened in Alaska or some other distant point, they would have been widely heralded and advertised.

As boring continues in the neighborhood of Stockton, San Joaquin county, large quantities of natural gas are being developed. The latest is a new well at the local glass works with a flow of 75,000 cu. ft. daily. There are more gas-wells at this point than anywhere in California, and in consequence Stockton is rapidly increasing in importance as a manufacturing point. Sacramento county is also utilizing its gas from two wells. The only other place where the gas wells amount to much is at Summerland, Santa Barbara county, and there they are only utilized for domestic purposes in a small way.

The old fight between the miner and the farmer has again been going on upon a small scale in the matter of the alleged pollution of the Mokelumne river in Calaveras county, thence running down to the bay. Complaint was made that tailings from the copper plant at Campo Seco were polluting the waters of the river, destroying the fish, and injuring the vegetation along the banks. The Chamber of Commerce of Stockton was asked to bring injunction suits, but before doing this made exact inquiry. Samples of water were tested by a chemist, and no free acids were found. The State Fish Commission investigated the matter, and found that nothing deleterious is passing into the river from the copper mines, but that the water is discolored by material from the Gwin quartz mine, caused by crushing much blue slaty rock. No acids are used at all at the mine. It is found that no fish have been killed. The Chamber of Commerce committee found that the alfalfa fields alleged to have been injured by deleterious substances had not been irrigated at all; but adjoining fields, which were irrigated, were in fine condition. The water had not anywhere injured fields

or crops. In fact, this quartz debris is beneficial rather than otherwise, as many rich tracts for garden purposes have been created by the tailings. Thus another attempt to draw the quartz mines into the old debris fight falls to the ground. The Fish Commissioners have no authority to stop mining, as no fish are found to be injured, and the Stockton Chamber of Commerce can find no injury to crops. Of course, if a case could be made out against any quartz miners it would give a fine chance for blackmail against them in many other places.

Spokane. Nov. 25.

(From Our Special Correspondent.)

Major R. G. Edwards Leckie, formerly manager of the Republic mine, and one of the best known young mining engineers in the Spokane mining field, is lying desperately wounded in East Africa from a mauling which he received there in a fight with a leopard. After leaving the management of the Republic mine Major Leckie served as a captain in the Strathcona Horse, the Canadian contingent fighting the Boers, and subsequently he formed a company in London which secured a mining concession of 100 square miles in Somaliland, East Africa.

Dr. W. A. Hendryx, inventor of the new cyanide process, has completed arrangements to install a plant at the Mountain Lion mill in Republic camp, with a capacity of 50 tons a day, to test the ores of the district. He has also received an order for a plant of similar size for the Waterloo mine at Camp McKinney, B. C. He is making tests on the low-grade iron-sulphur-arsenic ores of the Kootenay mine at Rossland, B. C.

Charles Sweeny, president of the Federal Mining & Smelting Co., has been in New York, completing contracts with the American Smelting & Refining Co. for the treatment of his company's Coeur d'Alene ores. The various companies, since their amalgamation, have been working with the smelters under the contracts which the subsidiary companies in the combine had before the amalgamation. There has been considerable delay in getting to a new settlement. The Federal Co. started out with a demand for a four-year contract and an option to renew the contract for two years longer, making six years in all. There has been some hitch in regulating the payment for the lead during such a long term.

E. J. Wilson, manager of the Northport smelter, says that the company is running four furnaces and is treating from 800 to 1,000 tons of ore daily, with a total force of 180 men. This is a substantial reduction in the working force. The Le Roi, at Rossland, is supplying most of the ores. Automatic dumping cars have been introduced to charge the furnaces.

The Last Chance mine at Wardner, Idaho, owned by the Federal Mining & Smelting Co., is being operated now by electric power furnished over the 100-mile transmission line from Spokane. It is the last mine of the Coeur d'Alenes receiving the power to have its machinery put in commission.

The litigation involving the sale of the Big Buffalo group in Buffalo Hump, Ida., to Charles Sweeny, four years ago, has been revived by a suit brought in the Superior Court here by J. M. Justus against R. M. Sherman and Effie G. Sherman to recover $3,958. He alleges that he and his partner, Perry J. Mallory —who has assigned his claim to Justus—owned a third of a half-interest in the Big Buffalo, the Merrimac and the Orofino. The rest of the half was owned by the Shermans and J. N. Rice. The Shermans are charged with contracting to sell the half interest to Mr. Sweeny for $109,375, while reporting to Justus and Mallory that $85,000 was to be the price. The defendants are sued for some of the excess money alleged to have been received from Mr. Sweeny, but not turned over to Justus and Mallory.

Toronto. Nov. 14.

(From Our Special Correspondent.)

In consequence of reported discoveries of nickel, cobalt, silver and arsenic ores in the vicinity of the Temiskaning & Northern Ontario Railway, now in course of construction, on or near the shore of Long Lake, the Provincial government has withdrawn from sale, lease or exploitation, a belt of land 10 miles wide on each side of the railway, extending from the north boundary of Widdifield township to the town of New Liskeard. The discoveries include surface indications of niccolite or rupfernickel, which contains about 44% nickel. Deposits of cobalt-nickel arsenic have also been found, resembling smaltite, and carrying, according to one assay, 6% nickel and 18% cobalt. Some specimens of silver ore have also been found.

The Bureau of Mines has commissioned Prof. W. G. Miller, Provincial geologist, to make an examination of the mineral deposits. His inspection is not yet complete, but his reports confirm the first statements as to the character of the deposits. One property examined contained a vein about 3.5 ft. wide, more or less mixed with rock, most of the ore consisting of a cobalt-nickel arsenide. There was also considerable silver and niccolite. Another property nearby contained a vein showing a length of 100 ft., consisting chiefly of cobalt-nickel arsenide coated with cobalt bloom. He secured a good set of samples of these ores for analysis. These discoveries are along the railway line about five miles from Haileybury. Niccolite has also been found about five miles west of this point, but no details as to the latter find are available. The Provincial government will have the area thoroughly explored at an early date, though the approach of winter will prevent much, if anything, being done for some months.

Thomas Southworth, forestry commissioner for Ontario, returned this week from inspecting the eastern forest reserve in Frontenac and Addington counties. One of the objects of his trip was to visit the gold prospect recently discovered in the reserves and report as to whether the application for patent should be entertained. The claim for a mining lot of 100 acres was made by the Star of the East Mining Co., the stockholders of which are mostly Buffalo and Pittsburg people. The property is situated just within the limits of the reserve in the rear of Frontenac county, some 20 miles from Kaladar Station, on the Canadian Pacific. It contains a vein on which two test pits have been sunk to a depth of about 30 ft. A shaft has been sunk on another vein which promises well. The company has 20 men at work under the management of E. J. Cowain, of Marmora. Applications have been put in by other companies or individuals for four other lots within the reserve, supposed to contain extensions of the deposit. According to existing regulations, it remains optional with the government to grant or refuse applications for mining lands embraced in forest reserves and no decision has yet been arrived at. It is probable that if any tenure of the land is given it will be in the form of a lease instead of a patent, with stringent restrictions and that operations will be closely controlled by the Crown Lands Department to prevent possible injury to the timber on the reserve.

Victoria. Nov. 24.

(From Our Special Correspondent.)

A parcel of ferraginous ore from Kootenay mountain, Rossland, was shipped last week to Spokane for test purposes by the Hendryx process, and, I am privately informed, the process is fairly amenable to this method of treatment, the percentage of recovery being 85%, while the tailings were found to contain but 93c. It is stated, meanwhile, that the Waterloo company, at Camp McKinney, has finally decided to install a Hendryx plant as a result of the recent successful experiment.

Atlin.—It is estimated that the value of the gold yield from the district will aggregate $430,000. Probably the largest individual clean-up was that of the Atlin Mining Co., which reports the recovery of $47,000 from 84½ days' operating.

Coast.—Work has been resumed at the Yreka copper mines, at Quetruso sound.

Cariboo.—J. B. Holran, manager of the Hydraulic Consolidated, informs me that the rainfall in September was so heavy that the company can depend on a good supply of water for next season. He proposes, however, to recommend to the directors to expend a further sum of $200,000 in extending and improving the present water system, and thus place the company in an independent position.

East Kootenay.—Development work on a large scale is being actively prosecuted at the Sullivan mine, Kimberley.

Lardeau.—An important strike is reported to have been made in No. 4 tunnel of the Eva mine, No. 2 vein having been encountered at a distance in of 269 ft. The ore-body has widened out to 12 in. and gave high values. The Anna group, on Pool creek, a promising galena property, has been bonded. The Great Northern Mines, Ltd., has made the final payment on the purchase of the Swede group at Poplar.

Lillooett.—Nine carloads of machinery have been unloaded at Ashcroft and transported by wagon 64 miles to Lillooett for a large gold dredging plant being built there. At Lytton, another large steel dredge is being built and this and a dredge previously in use will be operated on the Fraser river at Lytton next spring. It is stated that the lowest returns obtained from prospecting work on the Lytton company's leases, were 11½c. per cu. yd., while at 12 ft. from the surface in mid-stream, the gravel ran as high as $1.87 per cu. yd. The Lillooett dredge is of the approved New Zealand bucket type, and when completed will be the largest of the class in Canada.

Nelson.—The Bond Hill mine at Forty-nine creek, has made a first shipment of free milling ore to the Hall mines smelter for test purposes. The net returns on one lot of four tons gave $268, deducting freight, and treatment charges, and on another lot of five tons, $79. The owners propose to build a mill as soon as the extent of the ore-body is proved. On October the Wilcock mine produced a gold-brick weighing 325 oz, concentrates having a net value of $500, and two and a half carloads of galena, the net value of which was $2,500. The net profits for the month were $5,000. The manager of the Arlington mine, Erie, sends me the following report: During the month of October 130 tons of ore were shipped to the Hall mines smelter at Nelson. The net smelter returns were $5,396 and the expenses in British Columbia were $3,487, leaving a profit of $1,908. The report of the London & British Columbia Goldfields states that the total number of shares allotted is 109,164, all of which have been issued credited as paid up to the extent of 16s. per share, in consideration of the property and assets of the London & British Columbia Gold-fields (old company), dated July 23, 1903. The total amount received by the company in respect of the said 109,164 shares is £9,623, and on account of assets belonging to old company realized, £512. The payments in London have been: On capital account—payment on account of liabilities of old company, £7,547, and payments on account of registration expenses, etc., £572. The preliminary expenses are estimated at £1,300.

Revelstoke.—The British Columbia Mica Co., owning mica properties at Tete Jenne Cache, is negotiating with the Revelstoke Navigation Co. for putting a steamer on the upper river next season.

Rossland.—Operations at the I. X. L. have been suspended on account of cold weather. The clean-up from the last mill-run amounted to 172.5 oz. bullion.

Slocan.—Three feet of ore was struck last week in the new tunnel at the Silver Glance. Work has been started on the Redvers No. 2, and more men have been put on at the American Boy.

Ymir.—The ledge at the Atlin mine has been reached and drifting on the ore-body is now in progress. The transfer of the control of the Broken Hill Co., operating the Wilcox mine, has been completed, P. White, formerly superintendent of the property, having disposed of his holding.

San Luis Potosi. Nov. 24.

(From Our Special Correspondent.)

The Mexican National railroad has at last finished the widening the gauge of its road between Laredo and the City of Mexico, and the new through train was put on last week. The change cost in the neighborhood of $3,000,000, gold, but besides shortening the line about 10%, many curves have been cut off and grades reduced, and new territory opened up near the city, so the gain to the company will eventually be very great.

The established mining companies seem to keep well up to the mark, and the 20 companies whose dividends were reported last month paid to their stockholders $564,300, Mexican currency.

The Caldos mine, near Parral, is reported to have opened a large body of 60 oz. silver ore; Frank Paterson, of New York, has taken up considerable territory in the Parral district for eastern capital, and the American Smelting & Refining Co. is said to be after the Cigarrero mine, between Parral and Jimenez, which now is producing about 100 tons a day of a good silver-lead ore.

In Coahuila new machinery has been ordered for the Calabazas mine, Cotaus district, of which W. H. Watson is manager. The Mexican Coal & Coke Co. is increasing its plant on Las Esperanzas coal-fields.

In Sonora preparations are being made for the construction of an electric road between Rouquillo and Cananea, a distance of 2.5 miles. At Alamos the Santa Fe Co., owned by the International Copper & Gold Co., of Chicago, is putting up a 10-stamp mill on the Pedregal and Negra, both rich in gold, under the management of C. F. Tolman, formerly with the Anaconda Co., at Butte, Mont. On the Luckey Tiger, on which property the ore is improving with depth, a mill is also to be erected. The Arizona Mining & Development Co. is planning on a mill at the Gold Treasure, in the San José mountains, in northwest Sonora, where large ore-bodies have been blocked out. A New York company, with H. Hassel as manager, has started work on La Gloria, in the Bacoachi district. Colorado people are said to have bought Los Licenciados, a few miles south of Santa Rosa. The $600,000 Mexican option held on the Soledad of the Altar district having expired, a new one has been given on the property to Col. Fox, of San Francisco. A strike is reported by the Tarasca Gold Mining Co., about 12 miles south of Torres, and also on the properties of the Mina Grande Mining Company.

For some unaccountable reason the Guggenheim interests in Tepezalá, State of Aguas Calientes, are almost closed down. The Fortuna mine, of the same camp, owned and operated by Messrs. Creveling & Wardman, of Aguas Calientes, who paid some $40,000. Mexican, for the property, is a steady shipper and continues to improve.

London. Nov. 14.

(From Our Special Correspondent.)

In spite of the depression in the mining market, the business of Fraser & Chalmers, Ltd., continues to prosper. The net trading profit for the year ended June 30 last amounted to £46,000, while £21,000 was received as interest on shares held in the Allis-Chalmers Co. After payment of management and other expenses and allowing for depreciation the divisible profit was £48,000, out of which dividends at the rate of 10% have been paid on the ordinary and preference shares. The report mentions that the labor difficulties in South Africa have caused a slackening in the demand for heavy machinery, but a very fair business has been done in smaller machinery and supplies. The success of this business, since it was separated from the Chicago business, at the time of the latter's absorption in the Allis-Chalmers Co. has been very gratifying, and amply proves the wise judgment, which decided to terminate the unsatisfactory working arrangements between Erith and Chicago.

The report of the Montana Mining Co. for the half year ended June 30 shows that there continues to be considerable difficulty in earning expenses in the treatment of the ore at Drumlummon and Lucky Girl, owing to the very low grade. At the former 15,250 tons of ore yielded gold and silver to the value of only $3.50 per ton, while the expenses amounted to $66,700, a loss of $13,384. As the tailings and slimes plant was only in operation seven weeks, the full value of the ore milled was not obtained, so that the loss in treatment was more apparent than real, and should be made good later on. The extraction from cyanide treatment during that short time amounted to $21,127, while the costs were $24,297. A large part of this cost was due to the change in the plant and method of treatment, so that here again the losses are only of a temporary nature. The Lucky Girl group, which was acquired some two years ago, has not been a good speculation, as the ore has turned out to be of much lower grade than was expected. The directors of the company are proposing to reduce the nominal capital of the company from £660,000 in £1 shares having 19s. paid up, to £99,000 in 3s. shares, having 2s. paid up; but it is not intended to call up the 1s. per share until some specific use can be found for such capital. In spite of the loss incurred in working this year, the company still has £44,000 cash in hand, of which the bulk is invested in first-class securities, so that the new nominal capital will very nearly represent the actual assets of the company. There can be no doubt that the shareholders will agree to the proposition.

Perth, W. A. Oct. 12.

(From Our Special Correspondent.)

At Southern Cross the recent important finds continue to open up well. Many prospectors are at work and some getting good returns.

Negotiations are in progress for the purchase of the Pilgrims Rest gold mine. The price asked is £35,000. The British Exploration Co. is examining the property thoroughly.

A fresh discovery has been made about eight miles from Parker's range, the reef near the surface is 2 ft. wide and has been followed for 100 ft.; value 1½ oz. per ton. The Jacoletti lease is doing well and promises to become a payable mine, last crushing was 81 oz from 95 tons.

The Associated Northern is still pushing on work to locate the deep ore body cut by the diamond drill, but so far without success—it being presumed that a serious deflection in the course of the drill took place. Attention is once more being attracted to the northern end of the Hannan's Belt, by the good discoveries in Devon Consols mine and other fields; several leases that were given up as hopeless, are now being again worked, and by the use of the diamond drill, will no doubt have their value more accurately determined.

Black Range.—This district is promising, but the lack of adequate water supply rather hampers working. Two rich reefs have been opened on the prospector's claim and Hack's lease also has some good stone exposed.

Bulong.—After several years' hard struggle the Queen Margaret mine has closed, the company deciding to confine work to its South Gippsland property.

Coolgardie.—Bayley gold mines have been successfully reconstructed, and operations on the mine resumed.

Kalgoorlie.—The Great Boulder's main shaft is now down 1,800 ft. At the 1,762-ft. level a seam of quartz 3 ft. wide and valued at 15 dwt. per ton, was found. Active prospecting is going on by diamond drill toward the southern part of the property.. Ivanhoe is making important additions to its surface equipment, and will include a new hoisting plant, a powerful air-compressor (Walker's), 3 Gates rock-breakers, Robin's belt conveyor, 2 large electrical generators and other machinery entailing an expenditure of £30,000. The total output of the Ivanhoe mine to date has been 17 tons, 16¾ cwt. of fine gold.

Kanowna.—The Lady Robinson Co. has struck two reefs at the 300-ft. level, the first body was 20 ft. wide and averaged 10 dwt. per ton. The second formation is 12 ft. wide and assays 13 dwt. per ton.

Lake View Consols.—The estimates of ore reserves on the 30th of September were as follows: 167,358 tons, averaging 11¼ dwt. per ton, of which 98,754 were blocked out on 3 sides, worth 10 dwt. per ton, and 67,604 tons blocked out on 2 sides, averaging 12½ dwt. per ton, showing a total value in fine gold of about £400,000 ($2,000,000).

Sydney, N. S. W. Oct. 29.

(From Our Special Correspondent.)

Queensland.—At Charters Towers several of the mines happen to have had poor crushings at about the same time, which has caused a check, and all shares have had a slump in consequence.

The Golden Gate Consols, Croydon, has had another partial clean-up from which 1,117 oz. 16 dwt. retorted gold were obtained from 475 tons of ore. The New Wylie creek dredge is the first in Queensland to earn a dividend. It is dredging for tin at Stanthorpe.

New South Wales.—An asbestos property at Gundagai has been taken up by a Victorian syndicate, which is about to work it. Contracts have been entered into with asbestos buyers to take 2,000 to 3,000 tons per annum if the mineral is of the required quality.

One good find of opal was recently made at White Cliffs, when Ross brothers unearthed a parcel of splendid stone from a depth of 17 ft. on the extreme corner of block 5, which subsequently realized £2,000. One gem weighed 21 oz. and another 14 oz. In the early days of the field Saul's patch yielded a parcel which sold for £3,200. While sinking a shaft in the main street of the town a man lately unearthed a piece of opal which realized £2.

A remarkably rich patch has been struck in the King's Reef, Hillend, at a depth of 240 ft., where the reef is 18 in. wide, and shows gold freely. Half a ton, which has been extracted, is estimated to yield 1,000 oz. to the ton. These specimens are said to be the richest seen at Hillend for 35 years.

At Wyalong rich stone is now being met with at the Shamrock, which at present is let on tribute. It is rather a coincidence that both this property and everything, including rock drills, poppet legs and the Barrier were purchased at big figures by companies, which in each case met with comparative failure. In the case of the Barrier, the company sold everything up, including rock drills, poppet legs and engine, and the party coming after them is now in possession of one of the best shows on the field.

There was lately a rush to Narran, near Yalgogrin, in the Wyalong district, where prospectors working an old shaft found two nuggets of gold, one weighing 7 oz. the other 1.5 oz.; other works were unsatisfactory, so most of the miners who went have left again.

The New South Wales arbitration act was supposed to put a stop to strikes, but the other day the wheelers at the Pelaw Main coal mine, near Maitland, went on strike, and consequently threw the mine idle. The colliery proprietors intended to make a test case of this, and took steps to prosecute them, but the wheelers thought better of their action and returned to work.

The Homeward Bound mine, at Yalwal, has just established a record in working low-grade ores at a profit in Australia. The average return for the past five weeks on 2,273 tons of stone treated was 1.5 dwt. per ton. The recovery was 23 grains by amalgamation and 13 grains per ton by cyanidation. The entire cost of mining, milling, cyaniding, etc., was under $11.20 per ton. The facilities are all in favor of cheap mining, as the ore is got chiefly by quarrying, and is transported by an inclined plane to the battery and thence to the cyanide plant by gravity. As instances of cheap mining in Victoria, where the conditions are not so favorable as at Yalmal, may be mentioned: Thomas United (Bendigo), 1 dwt. 14 grains, cost of treatment $1.14 per ton; Stewarts' United (Bendigo), 1 dwt. 21.75 grains, cost of treatment $1.65 per ton; Central Ellsmere (Ellsmere), 1 dwt. 15 grains, cost of treatment $1.81 per ton; Fosterville Co. (Fosterville), 2 dwt. 7 grains per ton. The two Bendigo companies were able to pay dividends on the averages stated, while the two latter were able to meet the expenses incurred in mining, etc.

Tasmania.—An English syndicate has completed the purchase of the Tasmanian mine, Beconsfield. Some fine crystals of chromate of lead have lately been found in the gossan at the West Comet mine, Dundas.

Some of the low-grade propositions in Tasmania are beginning to show what they can do in the way of paying dividends. The Magnet Silver Mining Co. has declared its first dividend of 24c. per share, while the Hercules Gold & Silver mine, operating at Mt. Reid, which paid its first dividend in June last, will declare another this month.

GENERAL MINING NEWS.

Petroleum.—A summary of operations in the eastern oil fields during October, gleaned from the Oil City *Derrick*, is as follows: Pennsylvania completed 824 wells, 218 dry, with a new production of 5,486 bbls.; Ohio completed, in the Lima field, 358 wells, 29 dry, with a production of 4,179 bbls.; Indiana completed, in the Lima field, 375 wells, 27 dry, with a production of 4,627 bbls.; West Virginia completed 202 wells, 69 dry, with a production of 2,669 bbls., a gain of 204 bbls. over October.

In the Pennsylvania and Lima oil districts the record for November shows 1,557 wells completed, including 274 dusters and gassers, and a total new production of 14,292 bbls. This was a loss of eight wells, 536 bbls. production and 22 dry holes from October. The record of new work at the close of November shows 709 rigs and 1,479 wells drilling, a gain of 47 rigs and 20 wells drilling over the October figures.

ALASKA.

Arctic Mining & Trading Co.—The capital stock of this company has been increased from $100,000 to $1,000,000. The property, it is reported, consists of 142 gold placer mines on Seaward peninsula, 10 at the head of Nome river, 24 tin placer claims and 20 tin quartz claims in other parts. The company has a trading post at Teller. Max R. Hirshberg is superintendent.

ARIZONA.

GILA COUNTY.

Old Dominion.—At this mine the big 4-compartment shaft is down 541 ft. The tenth level crosscut has been driven to a point in line with the shaft at a depth of 626 ft., and the shaft will be opened to the tenth level within a month. Four stacks are in place, and fires have been started under the new sterling boilers at the shaft. Track laying has continued and the rails have almost reached the main shaft. A locomotive has been shipped from Pittsburg and one of the new furnaces is en route to Globe.

GRAHAM COUNTY.

(From Our Special Correspondent.)

Arizona Copper Co., Ltd.—This company is credited with the production of 60 tons of copper bullion daily. The production for the month of October was 1,795 tons.

New England Consolidated.—This is the title of the new organization formed by the merger of the New England Copper Co. and the Clifton Consolidated. A. P. Ayling remains as general manager.

Northern Point.—At a depth of 200 ft. a large body of sulphide ore has been opened, said to average 9% copper. This is one of the Hughes-Shannon group in the Clifton district.

PIMA COUNTY.

Producer Mining & Smelting Co.—This company, at Brownell, near Quijotoa, it is reported, is to have its 50-ton smelter completed very soon. The deepest shaft is down 200 ft., the ore is copper, carrying silver and gold, and about 35 men are employed.

(From Our Special Correspondent.)

Bradford Development Co.—This company has acquired three claims about 10 miles southeast of Vail's station. Stewart Bradford, of Tucson, is reported as secretary and treasurer.

Helvetia.—Exploration is to be resumed upon this copper group, about 25 miles south of Tucson. A new company has been formed called the Michigan & Arizona Development Co. The shaft on the Isle Royal mine, now down about 400 ft., will be sunk to 1,000 ft.

SANTA CRUZ COUNTY.

(From Our Special Correspondent.)

Darwin.—This mine, known, also, as the Constitution, has been purchased by the Salero Mines Co., from Petersen and Clarke.

Eureka-Mabel.—A carload of hand-sorted ore has just been shipped. It is a mixture of galenite, gray copper and manganese-spar with quartz, and carries high values in silver. W. E. Balcom is superintendent.

CALIFORNIA.

AMADOR COUNTY.

Argonaut Mining Co.—At this mine, Jackson, shaft repairs are finished to the 1,200-ft. level, but the mine will not be in working order before spring.

Fremont Consolidated Mining Co.—At the first clean-up at this mine, Amador City, the ore averaged over $5 per ton.

South Eureka Mining Co.—Between 50 and 60 men struck at this mine, Sutter creek, causing a shutdown.

BUTTE COUNTY.

Butte Queen.—This company has run a 2,000-ft. tunnel at Inskip to tap the old workings of the Butte King claim.

Golden Mountain.—At this mine, Inskip, owned by Larzelere Bros., the tunnel is in 600 ft. and men will be put on shortly. There is a 10-stamp mill on the property.

CALAVERAS COUNTY.

Angels.—The advent of the water season has started up a number of mines at Angels. The Sultana was the first to start its mill, followed by the Angels, Oriole, Gold Cliff and Madison mills. At the Cross shaft of the Utica company water has been turned on in place of steam. About 500 more men were set at work last week in the camp.

Angels Mining Co.—This mine, Angels, owned by James V. Coleman, with Thomas H. Fullen as superintendent, has resumed. The new 20-stamp mill is in operation.

Forty-nine Mine.—This claim, at Douglas Flat, has resumed operations.

Penn Chemical Works.—At this copper property, Campo Seco, the new shaft has reached 300 ft. and a crosscut from the old works to the shaft is about completed.

CONTRA COSTA COUNTY.

Wilson Lyon & Co., of San Francisco, have leased the sandstone quarry on the Fraser place, near Martinez, and some of the stone is used on the new depots of the Santa Fe Railroad.

EL DORADO COUNTY.

El Dorado Copper Co.—This company has completed the steam hoist at the Eureka mine, and the triple compartment shaft is making good progress in sinking.

Ida Mitchell.—Work is to be started on this mine, in Placerville, on December 1.

Lady Emma.—A 2-stamp mill is being put on this mine, at Kelsey, by B. Peters.

INYO COUNTY.

Tuba.—This mine, in the Panamint mountains, owned by W. S. James and J. P. Flint, is running a 6-stamp mill on $30 rock. The tailings from a previous run were recently cyanided and netted over $10 per ton.

KERN COUNTY.

Angelus Mining & Milling Co.—At this company's property, 16 miles southeast of Johannesburg, a good flow of water was struck in a well 240 ft. deep. The company is developing a large body of gold-bearing gravel.

Queen Esther.—This mine, near Mohave, known as the Thompson & Boyle claim, is to be opened. It is a tunnel proposition and has a large mill and cyanide plant.

LOS ANGELES COUNTY.

San Gabriel Cañon.—Only one mine in this cañon is now producing gold, though assessment work is being done on a number of claims scattered along the cañon for 30 miles.

NEVADA COUNTY.

Central Consolidated.—Superintendent Coflin, of this company, has, after several months' hard work, intersected the Greenhorn vein in the cross-cut driven into the footwall. It averages 2 ft. in width, with good values.

Idaho Development Co.—This company, at Grass Valley, operating the South Idaho mine, has bought five more adjacent claims. About $12,000 has been expended in development work this year.

Osceola.—This mine, at Rough and Ready, has been bonded to Frank Enzensperger, who has put men at work sinking a new shaft.

Seven-Thirty.—This mine, in Rough and Ready district, recently bonded by Root & Heisner, is being worked steadily. It is supposed to have four distinct ore-shoots.

West Point.—This mine, at Rough and Ready, operated by Estes & Snook, has been turning out very rich ore.

Yuba River Placer.—This company, working in the bed of the Yuba river, has abandoned work until low water next season.

PLACER COUNTY.

Boulder.—At this mine, in Ophir district, three miles from Auburn, 15 men are employed and new machinery installed, including three power drills. The mine is owned by W. B. Swears, of San Francisco, and S. Cooper is superintendent.

RIVERSIDE COUNTY.

Bowler Free Gold Mining Co.—This group, in Pacific district, Chuckawalla mountains, has been shipping high-grade ore to the smelter on San Francisco bay. The company owns 23 claims about 23 miles east of Salton.

SAN DIEGO COUNTY.

Two new gold-bearing ledges have been found in the Cuyamaco region, about four miles from the Stonewall mine.

Elevada.—This mine, at Banner, F. D. Jones superintendent, has closed down temporarily.

Glade Mining Co.—This company is working the Noble mines, at Descanso, and employing about 40 men. The plant consists of five stamps with a concentrator.

Helvetia.—This mine, at Julian, is yielding some rich telluride ore from its 400-ft level. They have 38 men at work and running 10 stamps.

Ranchita.—At this mine, Banner, some rich ore has been discovered in a crosscut on the 400 level.

San Diego Gem Co.—W. H. Trenchard, manager of this company, has gone to Jacumba to begin work on two claims rich in crystals. The gem found is a bright orange tint called hyacinth.

SAN JOAQUIN COUNTY.

A heavy flow of natural gas has been struck at 2,300 ft. by the Stockton Glass Co. at Stockton. The well furnishes 75,000 cu. ft. of gas per day and another well will be sunk at once.

SANTA BARBARA COUNTY.

Rincon Rancho.—A portion of this rancho, owned by A. L. Den, has been leased by San Francisco men. It is 10 miles from Santa Barbara, near a large asphalt deposit. Oil boring will begin at once.

SHASTA COUNTY.

Miller.—At this mine, Lower Springs, 20 men are getting out ore to ship to the smelters at Keswick.

SIERRA COUNTY.

Elnore.—This mine, in Ladies' cañon, near Downieville, owned by H. H. Blood, M. Duval and Geo. McGee, is having its shaft sunk deeper.

Lassiat Gold Mining Co.—This company, near Gold Valley, John B. Lassiat superintendent, has put new machinery on the Willoughby claim and the mill will commence crushing December 1.

New Enterprise.—The 300-ft tunnel on this mine is nearly completed.

Oriental Mining Co.—This company, near Alleghany, will soon have its 1,800-ft, tunnel finished.

Papoose.—A fine ledge has been opened up at this mine, in Jim Crow cañon, under bond to E. F. Harris.

Rosasco.—This mine, near Downieville, has been bonded to men from Tonopah, Nev., who have commenced operations.

Telegraph.—This mine, about nine miles from Downieville, has its new mill running.

White Bear.—This mine, near Downieville, W. J. Belcher superintendent, is employing 25 men and taking out good gravel.

SISKIYOU COUNTY.

Mono.—A 10-stamp mill is to be put on this mine.

Mott.—This property, near Oak Bar, has been sold to Chas. Gresswell and W. Harvey, of San Francisco. There are 80 acres of old Klamath river channel.

Pine Grove.—Work is to commence at once at this mine, near Oak Bar, M. J. Whitney manager, with an abundance of water.

TUOLUMNE COUNTY.

App.—It is stated that work will shortly be resumed at this mine.

El Rico Mining Co.—This company, at Tuttletown, is to put up a 20-stamp mill.

Mack.—At this mine a roller mill has been installed.

Nonpareil.—The shaft is being retimbered at this mine and foundations for the mill being prepared.

Tuolumne Electric Power Co.—This company has agreed to run wires to mines and mills south of the river if the owners will guarantee to purchase sufficient power to justify the cost.

COLORADO.

CLEAR CREEK COUNTY.

Centennial.—The ore streak in the fifth level continues good and others are being cut.

Gold Anchor Mining & Milling Co.—This company, at Yankee hill, has leased the concentrating plant of the Unity Gold Mining Co. at Alice and will run a test lot of ore from their property. It is a 20-stamp mill and half is in condition for operations. If the mill proves to be adapted to the Gold Anchor ores, the other 10 stamps will be put in shape.

Honest John.—A new plant has arrived for this tunnel, consisting of an 85 h. p. boiler and a two-stage Sullivan compressor of 550 cu. ft. capacity, capable of running four 3¼-in. slugger drills. The power house is being erected on the flat at the forks of Chicago creek. The tunnel has reached a depth of 450 ft. and the portal is about eight miles above Idaho Springs.

Little Jack.—A good strike of ore, assaying from 850 oz. to 1,240 oz. of silver, is reported in this mine, near Georgetown, owned by the St. Paul Mining Co. Haggart & Co. have a good lease on a lower level.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Coal Situation.—Operations are about the same, most of the companies being furnished with some coal during the past week. At three or four properties the shortage made necessary the curtailing of some work so as to continue pumping.

Boston-Occidental Mining Co.—The following officers were elected recently: C. S. Ripley, president; W. A. Priest, vice-president; E. M. Stedman, secretary; Josiah Stedman, treasurer; James H. Ripley, managing director; Marshall Stedman, superintendent. The company owns mining and milling property in the Pine mining district.

Delmonico Gold Mining Co.—A new steel cable 1,700 ft. long has been received and as soon as the coal question is settled sinking will be resumed, the shaft being down 1,350 ft. E. Steffan, Central City, is manager.

Fulton Mining & Milling Co.—This company, capital stock, $500,000, will operate the Robert Fulton group of claims in the Russell district and is composed of Idaho Springs and eastern parties. The main shaft is down about 360 ft., and new machinery will be required for operation.

Perigo Mines, Land & Townsite Co.—Thomas H. Potter and J. E. Lightbourne, of Central City, have conveyed to this company the Perigo group and other lode and placer property; the Perigo mill, together with all equipments, etc., the consideration being $500,000.

Roderick Dhu Gold Mining Co.—During the past month the company kept cutting to make its Protection shaft and the work is completed to 325 ft. The company took out considerable free milling ore. Work has been commenced extending the 250 and 325 ft. levels and the vein opened up for 22 ft. in width in the 250 ft. level and 10 ft. wide in the lower level. John C. Fleschhutz, Central City, is manager.

HINSDALE COUNTY.

Ironclad.—Tunnel No. 2 is reported to have cut a rich ore shoot and will be among the producers next season.

M. G.—This group is being developed by a crosscut tunnel to run 250 ft. into the mountain.

Wyoming.—This mine, in the Hensen creek section, is in bonanza ore, said to run better than $200 per ton.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

There is no change in tonnage situation this week, the output being about 2,400 tons daily of all classes of ore, but with the iron largely predominating.

Bartlett.—This leased property will soon have its 1,200-ft. tunnel completed to handle the water at little expense, and the tunnel has cut all the veins of the hill at a lower depth than ever before opened up.

Crown Point.—Lessees are operating through the old Weir shaft, and good carbonate ore is being shipped from the upper levels.

Doris.—There is a little prospecting on this property.

Favorite.—In sinking operations lessees have opened up a good grade material in the shaft and are arranging to ship.

Little Louise.—The new workings are showing high grade gold ore and much milling material.

New Home Mining Co.—Shipments average about 60 tons daily of fair grade iron material, while several new drifts are being run in virgin ground on good lead and iron ore.

New Monarch Mining Co.—Extensive plans have been completed for new work. The Lida, Winnie and Monarch shafts have opened up immense oxide and sulphide bodies and the Cleveland shaft is to be sunk to 2,000 feet.

Ready Cash.—Two shifts are now working through the tunnel and taking out good ore, in addition to developing virgin ground. Some of the ore runs 8 to 10 oz. gold.

Resurrection Gold Mining Co.—Production now averages 175 tons daily, handled by the mill with magnetic treatment. A cylindrical drier has been installed which delivers the pulverized ore to the separator, where a clean iron and a clean zinc product are separately made. About 25 tons daily are made by the machines, in addition to the lead product saved over the Wilfley tables.

Tiger.—The new workings have opened up a fair grade gold material from which occasional shipments are being made.

Valley.—There is a temporary shut-down, but arrangements are under way for a resumption.

OURAY COUNTY.

Camp Bird, Ltd.—The report for October states that the mill ran 31 days, crushed 6,229 tons of ore, yielding 8,379 oz. of bullion and about 366 tons concentrates. The sales of bullion, including cyanide mill bullion, brought $144,242, and 421 tons concentrates brought $24,603. Operating and other expenses amounted to $58,037. London expenses were about £700, leaving about £22,007 profit. The development amounted to 343 ft.

Governor.—W. R. Kramer is to place machinery on this property, in the Sneffles district, to work a rich gold vein struck recently.

PITKIN COUNTY.

Snow Mass.—Litigation on this property, near Aspen, is said to be at an end and work will soon commence. The present owner, W. Porter Nelson, has turned the property over to an eastern syndicate, mainly Pittsburg men, under a short lease and bond.

SAN JUAN COUNTY.

Fitz Lee.—Work on this property, owned by the Woods Investment Co., has been suspended for the season. This company owns 30 claims on Bear mountain, 24 patented, and 3,000 ft. of development has been done, 2,000 ft. on the Fitz Lee indicating a strong lead averaging about 5 ft. in width.

Gold King Consolidated Mines Co.—This company has completed a two-story, 40 by 150 ft. boarding house at the mouth of the American tunnel. At the 400-ton mill, now running, the foundations are laid and work being pushed for a 73 by 107-ft. addition. In this addition will be placed four tube mills, 5 by 14; five spiral sand pumps, 10-6-4 size; two sets of hydraulic placifiers, 36 Wilfley slime tables, two internal furnace boilers, marine type; a De Laval steam turbine alternating engine of 225 brake h. p.; a condenser of 465 sq. ft. of cooling surface; a Cochran feed-water heater and receiver combined for 225-h. p.; four motors of 30 h. p. each for driving the tube mill; five motors of 7½ h. p. each that will drive the 35 slime tables, and two 10-h. p. motors that will work the spiral pumps. The dry rooms have been enlarged and will handle the output of 40 Wilfleys and 35 new slime tables. At the mines the 700-ft. shaft connecting the Gold King level and the American tunnel has been timbered and an electric double-compartment cage hoist will be installed. The Gold King subway tunnel will be eventually the outlet of the entire mine. It starts at the upper end of the Gladstone mill and is now in 3,400 ft. Dividends paid last year to the stockholders amounted to $950,000. The Anglo-Saxon tunnel, which belongs to and is under the Gold King Company's management, is being driven ahead at the rate of 5 ft. a day with air drills and is in about 2,200 ft.

New York-Brooklyn.—This group in Emporium gulch, about seven miles from Silverton, has shipped two carloads a week this season said to have netted $500 a car. The vein has widened and now runs 8 oz. in gold, 12 oz. silver and 20% copper.

SUMMIT COUNTY.

Cashier.—At this property, in Brown's gulch, the 20-stamp mill is running full time on good gold-bearing quartz. The Lane pulverizer and amalgamator is said to be doing satisfactory work and increasing the capacity of the plant.

Providence-Colorado Mining & Milling Co.—The shaft is down 185 ft. and the water is easily handled. Low grade iron and lead sulphide ore is opened. H. S. Whitehead, of Breckenridge, is in charge.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

The Strike.—Excepting the murdering of Superintendent McCormick and Mr. Beck, of the Vindicator mine, the situation is about the same. The military force now in the district will be augmented.

Doctor-Jackpot.—Josiah Winchester has asked judgment for $253,444 against A. E. Carlton, Herbert Warne and J. J. Welcher as a result of the famous Doctor-Jackpot litigation that followed the rediscovery by Winchester of the lost Doctor ore shoot and the consolidation of the Doctor-Jackpot properties in Cripple Creek.

Elkton.—The Thompson lease on this property is working 70 men in three shifts. The machine drills are working during the day shift; hoisting and sorting during the day and second shifts. The machines are taken off on the second shift and single jackers put to work. The work on the last shift is tramming and hoisting. Eighty tons per day is the output, running about $20 per ton.

Stratton's Independence.—Between 480 and 500 men are employed in and outside of the mine. There have been no new developments lately and everything is running smoothly.

IDAHO.

CASSIA COUNTY.

(*From Our Special Correspondent.*)

Melcher.—The tunnel is in 2,150 ft., the face being 900 ft. beneath the surface. F. M. Langford, of Salt Lake City, is manager.

IDAHO COUNTY.

Hand.—L. C. Van Riper and others are opening this group of 17 claims on Beaver creek and will work during the winter.

Independence.—This property, in the Big creek district, is reported to be under bond to eastern parties. About 600 ft. of development work has been done, said to show ore that averages $8 in gold per ton.

LEMHI COUNTY.

(*From Our Special Correspondent.*)

Haidee Mining Co.—This company, at Leesburg, is pushing the 900-ft. tunnel. Cary Wright is manager.

Italian Mining Co.—This Leesburg property, after a temporary shut-down, will resume sinking at once. New machinery has been installed and other improvements made.

OWYHEE COUNTY.

Trade Dollar Extension Mining Co.—This company, of Silver City, Ida., has placed orders for a 50-h. p. Ingersoll-Sergeant air compressor and drills, 50-h. p. electric motor converter and 5,000 ft. of 2-in. pipe.

SHOSHONE COUNTY.

Last Chance.—The connections for supplying this company with electricity have been made by the Washington Water Power Co., of Spokane.

WASHINGTON COUNTY.

American Smelting & Refining Co.—A. G. Stevens, reported to be acting for this company, has secured options and bonds on about 40 copper and lead properties in the Heath mining district, about 50 miles from Weiser.

ILLINOIS.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Peabody Coal Co.—This company has reached coal in its shaft, about five miles north of Springfield.

Springfield Coal Mining Co.—This company has resumed operations at its No. 4 mine, the top works of which burned to the ground a few months ago.

INDIANA.

(*From Our Special Correspondent.*)

The State Mine Inspectors' Report for 1902 states that 23 new mines were opened during the year 1902, one in the block coal field and one in the bituminous. Four block mines and seven bituminous mines were abandoned. During 1902 8,763,197 tons of coal were mined, an increase of nearly 25% over 1901. The increase in production is due to the introduction of mining machines and has resulted in the displacement of a large number of pick miners. There were 13,139 mine workers employed during the year, a greater number than ever before employed in Indiana mines. The amount spent on improvements was $92,826.36. The number of machines used, 261. There were 24 fatalities during the year and 145 serious accidents.

DELAWARE COUNTY.

(*From Our Special Correspondent.*)

Much excitement has been caused near Gaston by the finding of a good bed of coal 30 ft. below the surface. A company has leased all the territory adjacent and are now sinking a shaft.

KNOX COUNTY.

(*From Our Special Correspondent.*)

Knox Coal Co.—Robert Williams, of Carmi, Ill., representing a syndicate of Illinois capitalists, has bought the Knox county coal mines at Bicknell, and will double their present capacity. The mines were opened several years ago and have always been a paying proposition.

MICHIGAN.

COPPER—ONTONAGAN COUNTY.

(*From Our Special Correspondent.*)

Michigan —Rock shipments to the Mass stamp mill have begun. About 250 tons daily is the present rate, and it will be increased gradually to 500 tons. Openings are large, and a wide expanse of copper-bearing ground is available for selection. A and B shafts are down 1,750 ft.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Leonard Mining Co.—This company has closed for the winter. About 225,000 cu. yd. of stripping have been taken from the pit and 7,750 tons of ore mined. No development will be carried on during the winter, but it hopes to start early next spring. The mine is in such shape that a week after operations begin it can be milling ore. M. A. Hanna & Co. handle Leonard ore.

Stevenson.—This mine shipped this year 1,014,582 tons, of which a little more than 25,000 tons was all-rail to St. Louis, Mo., furnaces.

Swallow, Hopkins & Holland.—Hand-stripping is in progress at the Holland mine, section 4, T. 58, R. 16, just west of Duluth and Canton mines. Figures of costs for the length of time covered by the work indicate that it is running about 30c. a cu. yd., which is much less than was expected by many, and very much under the bids of contractors. The entire amount to be moved is small, about 150,000 cu. yd., which accounted, in part, for the high estimates of contractors. This is to be a milling property, and a shaft will be sunk this winter. There are about 1,000,000 tons of excellent ore in the deposit. The owners of this mine have commenced exploration work with drills in the west side of section 2, T. 58, R. 18, where conditions are somewhat similar, so far as superficial investigation can show, to their part of section 4.

MONTANA.

LEWIS & CLARKE COUNTY.

(*From Our Special Correspondent.*)

Hubbard.—It is the intention to soon have the mill on this property, near Gould, in operation.

Jay Gould.—This property is under lease with option to purchase to J. C. Cory, of Helena. A cyanide mill has been purchased and is now being hauled to the site. The mine has produced a large amount of ore.

Missouri River Power Co.—The annual election held in New Jersey re-elected H. M. Holter and S. T. Houser, of Helena, and W. A. Clark directors and also members of the executive committee for another year.

PARK COUNTY.

Kimberly-Montana Gold Mining Co.—This company is preparing to start its new 40-stamp mill at Jardine. The old mill has been crushing rock for 8 months with good results. Two classes of ore are mined, one base and the other free milling. A concentrator and cyaniding plant are in operation.

POWELL COUNTY.

(*From Our Special Correspondent.*)

Amazon.—The 10-stamp mill on this property, at Danielsville, is busy on ore from the mine. Straight amalgamation is relied upon. The tailings have a value, it is claimed, of about $10 per ton. The lead on the Amazon is less than 3 ft. wide, but is all pay rock. Thirty-five men are employed in the mine and mill, working three shifts.

Dry Cottonwood.—It is the intention to operate a dredge on this ground in the spring. Test pits dug during this fall produced a number of good stones.

NEVADA.

NYE COUNTY.

(*From Our Special Correspondent.*)

Goldfield District.—For the past two weeks there has been considerable excitement over this district, discovered about three months ago and formerly known as Granpah. It is about 30 miles south of Tonopah, the formation being porphyry traversed by north and south ledges carrying free milling gold, and sensational values are claimed. The district is well supplied with fuel wood and springs of water rendering it doubly attractive in an arid region. Numerous sales of groups of claims are reported, chief of which is the Combination group, bonded by a Chicago syndicate for $75,000, payments extending over one year, with a payment of $5,000 made already. The greatest depth attained on the property is 32 ft in a tunnel which cut four ledges, claimed to average $30 per ton. A 70% interest in the Jumbo group has been bonded for $100,000, of which $2,000 was paid down by Patsy Clark, of Spokane, and John McKane, of Tonopah, and development work commenced with 10 men. Many smaller transactions are reported and claims located over an area 10 miles long by 8 miles wide. Two town sites have been located and buildings are being rapidly erected and two stages run daily from Tonopah.

Montana Tonopah.—The cross-cut on the 612-ft. level has proved the main ledge is 23 ft. wide.

Tonopah Mining Co.—The final survey of the Tonapah railway to the Seibert, or main shaft of this company, has been completed, and the necessary right of way obtained.

Victoria.—Sinking to the twenty-first level in No. 2 shaft has been started. Surface work will be discontinued during the winter. Work on a stamp mill will be begun next summer.

OREGON.

BAKER COUNTY.

Red Boy Consolidated Co.—This company has been placed in the hands of a receiver on application of Oscar O. Benson, a Portland man, owning 250,000 shares of Red Boy stock. He claims that the company owes him $3,000 on a note, and also owes Clark Tabor and E. J. Godfrey $15,000, James A. Howard $10,000, the First National Bank of Baker City, $10,000, and the First National Bank of Sumpter $15,000, making a total of $53,000. The Red Boy Consolidated is a merger of the Red Boy and the Concord. The Red Boy has its ore worked out and has a shaft down 500 ft. to open hoped-for reserves. The Red Boy has fine machinery, and the Concord was absorbed in the vain hope that it would develop ore to run the mill profitably.

JOSEPHINE COUNTY.

May Queen Mining Co.—The May Queen, Double Standard and Silver Standard quartz claims, all on Mt. Baldy, near Grant's Pass, have been purchased by the May Queen Mining Co., of Albany, N. Y., and are being developed under A. A. Cameron, of Grant's Pass.

LANE COUNTY.

Oregon Securities Co.—This company has employed hundreds of men all summer on its properties in the Bohemia district, near Cottage Grove. An immense dam has been completed on Brass creek. The mile flume and ditch, for conveying the water to the power-house, when opposite the power plant has a fall of 175 ft. through steel pipes on two Pelton wheels, supplying power to two 180-kw. generators. The power-house is finished and the machinery is nearly all installed. The pole line for 6 miles up Champion canyon is all constructed and the wires strung. The 30-stamp mill, at the head of the canyon, is fast nearing completion, and is expected to be ready by December 1.

PENNSYLVANIA.

ANTHRACITE COAL.

A large tract of anthracite land has been purchased near Trevorton, in the Shamokin district, by Cleveland, O., men, consisting of J. S. Van Epps, J. P. Burton and J. J. Phillips. It is the intention to develop the property at once.

Lehigh Coal Co.—All the Centralia mines and the Sioux and Mt. Carmel collieries of this company at Mt. Carmel, closed down November 30 indefinitely, throwing 2,500 men and boys out of employment.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Extreme Mining Co.—The new mill, it is stated, will start December 1. Walter Wright is manager.

Ivanhoe Mining Co.—A 500-ft. steam hoist and pump have arrived and are being installed.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Big Four Mining Co.—The shaft is 170 ft. deep and a station is being cut. The vein left the shaft at 150 ft., being at that point 70 ft. wide. Much water makes a new pump necessary.

Dakota Mining & Milling Co.—The cyanide plant at Deadwood will operate as soon as coal is obtained until spring, when it will be moved to the mine. T. J. Steele and J. P. Allison, of Sioux City, purchased 100,000 shares of this stock and have been elected to the board of directors.

Golden Crest Mining Co.—The first clean-up at the new cyanide mill resulted in 301.42 oz., valued at $5,125. This was only a partial clean-up made after 10 days' run in a 10-stamp cyanide mill. Frederick McL. Strout, recently of Denver, is in charge of the mill.

Golden Reward Mining Co.—The damage suits have been decided in favor of the defendant companies on all the issues. Damages were sought for injuries alleged to have been sustained owing to smoke and fumes from the smelter at Deadwood. It is expected that the smelter will now resume operations.

Lucky Strike Gold Mining Co.—The shaft will be continued from the 100 to the 200-ft. level, where more drifting will be done.

Reliance Gold Mining Co.—This company, a merger of the University and Ak-sar-ben companies, is building a new 300-ton cyanide mill. The University stock has all been called in and exchanged and a call issued for Ak-sar-ben stock. The exchange is being made share for share.

Rex Gold Mining Co.—New machinery is being installed at the shaft. A. C. Davis, of Lead, S. D., is superintendent.

Ruby Flat Gold Mining Co.—A vertical of silicious ore appearing in the lime has opened, assaying as high as $51 per ton gold. E. R. Short, of Deadwood, is president and manager.

Ruby Mining & Milling Co.—The Austin No. 2 crusher has arrived and is on its foundation. Power will be furnished by a large Fairbanks-Morse gasoline engine. Merrall stamps will be used and a Wilfley concentrating table.

Safe Investment Mining Co.—Operations have been resumed and the shaft is being continued. The Burlington railroad is putting in a spur for the company.

Spearfish Gold Mining & Reduction Co.—The last semi-monthly clean-up resulted in more than $16,000 in gold and bullion. The foundation has been laid for the Norwalk 12-drill air compressor. It is being placed at the mill and air will be piped to the mine, 3,000 ft. away.

Wauconda Mining Co.—A new hoist is being installed. Frank Ames, of Lead, is manager.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Batsons Prairie.—This new field, 14 miles north of Sour Lake and 7 miles west of Saratoga, is the scene of the latest Texas oil excitement, caused by a 500-bbl. producer brought in by the Parafine Oil Co., of Beaumont, at 980 ft. The place has no railway communication, but drilling machinery is being rushed in from Sour Lake and Saratoga, and many leases and purchases have been made. The Parafine Oil Co. owns 87 acres, and the Guffy Petroleum Co. and the Texas Co. are ready to commence operations. Many investors fear litigation on account of imperfect titles to much of the property adjacent to the new wells.

Sour Lake.—The Rio Bravo Oil Co. has 6 producing wells. Wildcat wells, between Sour Lake and Saratoga, are increasing. Among them are the Pirtle well, the John Hammond well, Betty Bryan Syndicate and the Melton & Gilbert. The following wells have been brought in recently: Texas Co. No. 18, Fern City Oil Co. No. 1, Quina Oil Co. No. 1, and 26 are being drilled. The production is rapidly falling off. The day of the air compressor is nearly finished and standard pumping rigs are being installed. Very little oil is moving, except that of the pipe-line companies and the Higgins Oil Co. and Rio Bravo Oil Co. Every one who possibly can is holding for better prices. Oil is quoted at 21 to 25c. at the well, and 30c. f. o. b. cars.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

The Security Oil Co.'s pipe line, between Sour Lake and Beaumont, is now in operation, and oil is flowing to their refinery at Beaumont. Its completion ought to help raise prices for Sour Lake crude, as the Texas Co. line and the Guffy Oil line have their own production and contract oil to look after. Oil is quoted at 40c. f. o. b.

UTAH.

BEAVER COUNTY.

(From Our Special Correspondent.)

Majestic.—The smelter is in operation. The matte being turned out, it is said, runs better than 45% copper.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Ore Shipments.—For the week ending November 20 shipments amounted to 135 car-loads, as follows: Centennial-Eureka, 34 cars; Yankee Consolidated, 3; Uncle Sam, 1; Tetro, 3; Richmond & Anaconda, 1; Gemini, 12; Eagle & Blue Bell, 12; Bullion-Beck, 5; South Swansea, 5; Swansea, 3; Dragon Iron, 21; La Clede, 1; Star Consolidated, 2; Black Jack, 7; Carisa, 3; Lower Mammoth, 11; Grand Central, 10; Ajax, 2.

Bullion-Beck and Champion.—This company has been made defendant in a $60,000 damage suit by the Eureka-Hill Mining Co. Unlawful extraction of ores is alleged.

Midas.—A terrific wind storm demolished this mill property recently. The structure will be rebuilt.

Uncle Sam.—This plant is about completed and will be in operation early in December.

Utah.—A good body of high grade ore has been encountered on the 700-ft. level.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Consolidated.—The copper bullion shipments for the week ending November 27 amounted to four cars, 240,000 lb., which compares with three car-loads, 180,000 lb., in the previous week.

Boston Consolidated.—The Bingham Copper Belt railway track to this mine will be completed in about one week. Shipments will then commence to the Bingham Consolidated smelter.

Galena.—This Bingham property, now a part of the United States Mining Co.'s domains, is to be operated again.

Ohio Copper Co.—At Miamisburg, O., this company has been organized to absorb the Columbia Copper Co. and mines at Bingham. The officers are Major Herbert Caitrow, president; A. J. Bettles, vice-president, and Henry Caitrow, secretary and treasurer.

United States Smelter.—Preparations are under way for the construction of the sixth copper furnace. C. E. Allen, general superintendent, has placed orders for the material. Shipments of copper bullion for the week ending November 20 amounted to four car-loads, 240,000 lb., and for the week ending November 27 amounted to three cars, 180,000 lb.

Utah Apex Mining Co.—Upon a basis of $250,000 this company has purchased 700,000 of the 1,000,000 shares in the Highland Boy Consolidated, adjoining the Utah Consolidated. The deal ends the pending litigation with the Petro Mining Co., controlled by the purchasing corporation. The latter's domains now embrace about 200 acres. W. C. Orem, of Salt Lake City, is manager.

Utah Consolidated Smelter.—Copper bullion shipments for the week ending November 20 were five cars, 300,000 lb., and for the weeking ending November 27 were five cars, 300,000 lb.

TOOELE COUNTY.

(From Our Special Correspondent.)

Honerine.—Eighteen Wilfley tables have arrived for installation in this new plant.

Sacramento.—A car-load of ore will be marketed in a few days.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Republic Ore Shipments.—For the week ending November 25 shipments were 1,155 tons, as follows: Mountain Lion, 378 tons to the Trail, and 322 tons to the Boundary Falls smelters; Trade Dollar, 40 tons to the Hall mines smelter, and Quilp, 415 tons to Tacoma.

Apollo Consolidated Mining Co.—At a shareholders' meeting held November 18 the old by-laws were repealed and new ones adopted.

Blue Horse.—About five miles of a new wagon road completed admits of hauling ore for shipment and work will shortly be resumed in the mine.

Flag Hill Gold Mining Co.—At a meeting held at Republic the directors re-elected were Phillip Creasor, Fred Birney, D. F. Hallahan, F. E. Elmendorf and C. O. Barness. The by-laws were amended to enable the trustees to collect unpaid assessments and proceed with work on the mine.

Golden Eagle.—The shaft is down 204 ft., and two 10-hour shifts are employed.

Ireland.—This property adjoins the Lone Pine claim on the east. The surface is being prospected.

Maud S.—The assessment work of 30 ft. driven on the tunnel level has been completed. A vein was encountered 3 ft. wide, with an 8-in. streak of ore on the footwall, reported to assay $174 per ton in gold, silver and lead.

Morning Glory.—Three men are prospecting on the 300-ft. sub-adit level.

Mountain Lion.—It is reported that a Hendryx agitator and tank has been ordered from the Union Iron Works to be installed in the mill.

Mountain Lion No. 2.—Two men are doing assessment work. This property is not connected with the Mountain Lion Co. or vein, but is on a different belt and owned by another company.

Knob Hill.—The ore in the tunnel is improving. Work will be pushed during the winter.

Red, White & Blue.—This embraces the Copper Bottom, Black Diamond, White Stone and Red, White & Blue claims. A tunnel, in 325 ft., has intersected three strata of pyritic ore. At the end of the tunnel a station will be cut and a shaft sunk 200 ft.

Trade Dollar.—This mine is to close down. Heavier machinery will be installed next spring.

Zala M.—The winze is down 90 ft. below the 300-ft. level and will be sunk 160 ft. deeper. Leads will be opened every 100 ft.

OKANOGAN COUNTY.

Interstate Mining Co.—A strike of ore running 20% lead is reported on the Delate claim of this com-

pany near Chesaw, at 50 ft. from the surface. Two shifts have been put on and drifts will be run. The 20-ton mill and concentrating plant will be renovated, the water flume reconstructed, and everything put in readiness to resume operations. Several hundred tons of ore are on the dump. Henry Thompson is superintendent.

Nighthawk Mining & Tunnel Co.—This company now has 10 men on its property north of Conconully driving a tunnel, which is 1,150 ft. in. Manager Church has purchased a ventilating plant.

(*From Our Special Correspondent.*)

A tunnel has been driven 100 ft. on the McD claim, from which a cross-cut is being driven. The McD adjoins the Bodie ground on the north. The Gold Dust claim, south of the Bodie, with the Myrtle intervening, has several open cuts across the vein cropping.

Bodie.—A drift on the main vein is being driven on a 3-ft. streak of $56 ore. The mill is almost ready to make the first run on ore.

Six Eagles.—The tunnel, it is reported, is in 1,650 ft. and getting into the foot-wall of the vein. The air is bad and the night shift has been laid off until the electric power plant at the Similkameen falls is completed.

STEVENS COUNTY.

Conquest.—At this mine, near Newport, between 20 and 25 men are busy. J. W. Hays and associates are now owners of the property, with J. W. Hays as manager. The new owners have installed machinery for sinking a double compartment shaft. The company has lately been acquiring additional property near the Conquest.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

The Mines Department reports the total coal mined in September at 64,693 long tons, an increase of 14,610 tons over September, 1902. There were 3,001 persons employed underground and 1,413 at surface. Exports of coal were 269 tons, and 25,304 tons were sold to steamships in the port of Durban.

ASIA.

INDIA—MYSORE.

Kolar Gold-field.—The total output of the mines in this field for October is reported at 52,724 oz. bullion, which is the largest monthly production ever noted from this field, and is 4,866 oz. more than in October, 1902. For the ten months ending with October, the total was 493,587 oz. bullion, against 417,881 oz. in the corresponding period last year, showing an increase of 75,706 oz. The total this year was equal to 444,228 oz. fine gold, or $9,182,193 in value.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending November 14 were as follows: Granby mines, 9,095 tons; Snow Shoe, 2,010 tons; Mother Lode, 3,904 tons; Oro Denoro, 825 tons; Winnipeg mine, 280 tons; Athelstan-Jack Pot, 210 tons; Emma, 792 tons; total for the week, 17,116 tons; total for the year to date, 564,170 tons. The Granby smelter treated 8,857 tons.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Crow's Nest Pass Coal Co.—The mines of this company are producing 3,400 tons of coal and 800 tons of coke daily. When the new coke ovens now nearly finished are placed in operation the output of coke will be 2,000 tons daily.

North Star.—No shipments are being made from this mine at present, as the contract in force the last three months has been filled. The ore will be stored on the property.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments—For the week ending November 21 shipments were as follows: Le Roi, 5,820 tons; Centre Star, 1,440; War Eagle, 1,170; Le Roi No. 2, 470; Le Roi No. 2 (milled), 350; Jumbo, 168; Spitzee, 60; I. X. L., (milled), 30; Kootenay, 240; Giant, 2 (test). Total, 9,690 tons; year to date, 358,880 tons.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Enterprise.—A large crew is at work on this property. It is under a three-year lease to W. C. E. Koch.

Hewitt.—This mine, owned by Spokane men, has increased its force and will push development through the winter.

Waterfield.—Work at this mine is being rushed. Owing to the low price of zinc the company is storing its zinc concentrates and selling the lead concentrates.

ONTARIO.

(*From an Occasional Correspondent.*)

A large deposit of iron ore, red hematite, is indicated by diamond drilling on lands near Ft. William, and close to the shore of Lake Superior. The borings extend over an area three miles in length and a half mile in width, and some of the borings indicate a thickness of from 60 to 70 ft. of ore. Analysis shows that the ore carries, in places, as high as 65% metallic iron, and that the phosphorus is within the bessemer limit.

ONTARIO—HASTINGS COUNTY.

(*From an Occasional Correspondent.*)

In regard to mining in Hastings county, much trouble is found in obtaining skilled mechanics and miners, as the large number of railroad extensions have swallowed the available men, such as they are, to this work; wages, are, in consequence, high, and men of all kinds scarce. Several gold prospects are being opened by unscrupulous persons, who have succeeded in deceiving the unwary investor with shows from other mines and samples picked from rich streaks, which will shortly be on the failure list.

The Cordova mines, or Belmont group, closed, according to the local papers, throwing 65 to 70 men out of work. Reasons are not given.

The Mundic mine is a steady shipper, and the Ontario Mining & Smelting Co. is placing its machinery, and expects to be ready to run night and day on galena ores about January 1. The vein looks good and steadily widens with depth. Two steam drills have been put in and substantial boiler-house and building for crusher and concentrator have been erected.

The Craig mine is building a boarding house for 20 to 25 men, but no mining has been done.

Rich strikes of arsenical gold ore are reported, but this should be taken with caution.

Belcher.—The No. 4 tunnel has broken into solid sulphide ore. A gasoline engine and blower are installed.

Pinnacle Mining & Milling Co.—This company, working a few miles north of Loomis, is putting in a gravity tram, by which it will send the ore from the upper tunnel to the wagon road, from whence they will haul it to the Black Bear mill.

Six Eagles Mining Co.—This company is now working 8 men on its tunnel, which is in 1,520 ft. The same interests also have a crew at work on the electric light plant at the Similkameen river falls, and 11 men working on the telephone line that will run from the Six Eagles mine through Nighthawk, thence via Similkameen falls to Oroville.

MINING STOCKS.

(Full quotations are given on pages 876 and 877.)

New York, Dec. 2.

The market, broadly speaking, is purely professional, and seems likely to continue so until something wholly unexpected removes the pall of depression that has caused the public to become apathetic. True, prices are among the lowest on record, but such bait seems insufficient to tempt buying at this time. In the mining list, the weakness in the copper market, the large assessment roll in the Comstock group, and the Colorado labor troubles have united to keep prices down. In the industrial section, Republic Iron & Steel preferred has attracted attention because the quarterly dividend of 1.75%, which would have been payable in January, has been postponed. The reason given is that the present conditions of the iron trade do not warrant a division of the company's profits. The preferred dividends are cumulative, and dividends in arrears will have to be paid some time. In the past year the company paid a total of $1,429,182 in dividends, making $6,053,476 in four years, being equivalent to 7% annually on the issued preferred stock.

Amalgamated Copper showed somewhat larger sales at $37.75@$40.875, while Anaconda weakened from $17.625 to $17. United common, of Montana, was exceptionally quiet, $10 being bid and $14 asked. Greene Consolidated, of Mexico, has lost footing, and slid from $12.625 to $10.875 on local sales. Tennesee, after softening to $27.50, turned up to $29, and appears firm. British Columbia re-appeared at $3@$2.875; White Knob, of Idaho, moved up from $8.75 to $9.375, but closes fractionally lower.

In the Colorado gold list, Portland, of Cripple Creek, rose from 95c. to $1.05, Elkton brought 41c., and Isabella sold again at 9c. El Paso came forward at 50c.

Daly, of Utah, changed hands at $1.20.

The Comstocks were supported by Consolidated California & Virginia, selling at $1.15@$1.20; Ophir, $1.45@$1.90; Mexican, 63@62c., and Sierra Nevada at 42c. Another sale of Silver Hill, the dividend stock was made at 65c.

Boston. Dec. 1.

(*From Our Special Correspondent.*)

The market for mining shares continues to drag its weary length along from day to day, but nothing startling develops. The present condition of the metal market does not tend to stimulate trading, and were it not for the fact that few stocks are being carried on margin, things might be very unpleasant. Manipulation in Copper Range Consolidated continues quite marked, and gives expression to some very unpleasant talk. During the week this stock touched $40.50, but rallied to $44.50 the following day. It closes $2 better than a week ago, at $43. It seems to be certain that some selling of Copper Range has been done by interests that took the stock for their Trimountain holdings. Centennial is dull and weak at $14.50@$14.25. There is renewed talk of an assessment on Centennial, but it will not come until a more auspicious time. Isle Royale became active late last week, and touched $6.87½, advancing from $6 on what was said to be buying for New York account. This company is reported earning money at the rate of from 50c. to $1 a share per year.

United States Coal & Oil also recorded a spurt. After falling to $7.75 it rallied to $9. This company is negotiating with the Standard Oil Co. to dispose of its oil lands, and confine operations entirely to the coal business. The company has some 60 oil wells, and is producing about 500 bbls. of oil per day. The selling price is said to be at the rate of $1,000 per bbl. of oil production.

The annual report of the Shannon Copper Co. was without effect on the stock, which sells at $8.50@$8. The directors were re-elected. The report shows gross profits for four months' running time of $158,971, and a balance of $88,169 above expenses and interest. Subsequently $60,000 bonds were retired. There are about 5½ miles of underground workings.

Old Dominion mining has been very quiet, although it has risen $1.37½ to $9.37½. The special meeting in Jersey City, Monday, was without market effect, although interrupted by the service of an injunction to restrain the merger with the Phelps-Dodge United Globe property. There was no opposition to the merger, as 137,827 out of the 150,000 shares had assented to it. As a result, however, the matter was carried over until December 14, when the hearing is called for. Mr. Fitzgerald, who is the principal in this case, is confident that the court will rule against the merger. Mr. Fitzgerald bases his fight on the report of Professor Church.

Bingham Consolidated sagged $1.50 to $20, with fractional recovery. About one-half the Bingham's smelter charge is for custom ore. The Commercial mine alone is turning in 200 tons of ore per day. Osceola is fractionally lower at $56@$56.25, and Quincy is off $2 to $80. Tamarack ranged from $90 to $85, with little doing in the stock. Utah is fractionally lower at $26.75, but Wolverine has advanced $2 to $67. United States is firmer at $17.50@$18. Victoria is quiet at $2.50. This company has about $125,000 in the treasury, and a two-stamp mill will be erected at once. In the report of the Boston Consolidated to the London directors, under date of November 9, Managing Director Newhouse states that the underground workings have been extended 2,254 ft. during the year, and the total cost of operations was $47,323. The ore in sight is estimated to be 1,668,716 tons, and should average 4% copper or better. There are gold and silver values in addition.

Colorado Springs. Nov. 27.

(*From Our Special Correspondent.*)

The market this week has been more satisfactory than for some time past, the volume of trading being good and prices holding up well. Another large channel of water was encountered this week by the big drainage tunnel, and as a consequence the flow from the portal of the tunnel is now about double what it was.

C. K. & N. weakened somewhat this week, selling at 18½@18c. Cripple Creek Consolidated was stronger at 2⅝c. Doctor-Jack Pot was in poor demand at lower prices, 5c. being the bid a week ago and 4½c. to-day. Elkton made a good advance, the sale price being 40½ at the close of last week and 43½ to-day. The advance in this stock is due to good reports from the property, the water having receded considerably as a result of the drainage tunnel's work. El Paso was somewhat weaker to-day than at the close a week ago; the selling price at that time was 50, while the stock changed hands at 49c. to-day. Gold Dollar continues to decline, 2½ being the bid price to-day, against 2¾c. last week. Isabella has been the most active stock on the board, declining from 8c. at the beginning of the week to 6c. and suddenly reacting to 7¼c., at which figure it closed. Portland was stationary at $1 per share.

San Francisco. Nov. 26.

(*From Our Special Correspondent.*)

The market has been rather quiet, with no pressing demand for Comstock shares. The Gold Hill stocks were rather heavy, and were not in demand, but the Northend shares were somewhat more active, principally owing to a demand which sprung up for Ophir.

Some quotations noted are: Ophir, $1.50@$1.60; Consolidated California & Virginia, 95@97c.; Mexican, 65c.; Hale & Norcross, 50c.; Sierra Nevada, 30c.; Yellow Jacket, 27c.; Gould & Curry, 21c.; Crown Point, 13c. per share.

On the San Francisco & Tonopah exchange, business was good and prices firmer. Considerable outside buying was reported. Tonopah, of Nevada, sold at $7; Montana Tonopah, $1.10; Tonopah North Star, 36c.; Rescue, 5c. per share.

On the California exchange, business in oil shares was rather dull. One sale of Hanford was reported at $138; Peerless sold at $13.75; Monte Cristo, 75@80c.; Independence, 15@16c. The business was chiefly in the lower priced shares.

COAL TRADE REVIEW.

New York, Dec. 2.

ANTHRACITE.

Continued cold weather and some snow storms in the East have had a good effect on the demostic coal trade and have stimulated buying on the part of those who did not lay in their winter supply early. As the buyers by the ton are generally in the majority, retail trade in the East shows a very decided improvement. In many cases prices have been advanced 25c. a ton, and in a few 50c. Consumers, however, have not forgotten last year, and do not generally make much objection to the raise, contrasting conditions with those of a year ago, when it was difficult to get coal at any price. No change has been made in wholesale prices at tidewater, and the business of the large shippers has not been materially affected.

The collieries are working as usual, after the Thanksgiving holiday. Some reports are current that large operators intend to meet the accumulation of stocks by cutting down the output, and perhaps closing some of the collieries. No concerted action has been taken as yet, however, and there is no doubt that the domestic production will be good. Of course, no comparison can be made with last year, but the production for the 10 months ending with October showed an increase of 13 per cent as compared with 1901. There seems to be little doubt that this year's production of anthracite will establish a new record.

Prices for domestic sizes continue unchanged at the schedule rate of $5 per ton, New York Harbor points. Prices for steam sizes are, if anything, somewhat lower.

BITUMINOUS.

There is slightly more activity in the Atlantic seaboard soft coal trade, superinduced by inadequate transportation facilities. Shipments from mines to tide take 10 days, and over, to run through, and the reason appears to be the retrenchment of the railroads, that have laid off some of their men. Maybe the railroads are regulating the car supply so as to give a better tone to the coal market—who knows? Those shippers, however, who are endeavoring to keep abreast of their orders, find the situation rather a hardship, but to others it is an advantage.

Trade in the far East is quiet, and to some extent the lower prices induce a little more buying. It would be well for consumers in this territory, who are making these purchases, to consider the likelihood of ocean freight rates going higher soon.

Long Island Sound business is somewhat improved. In the New York harbor territory there is also an increased demand, and the shortage of coal in some directions is particularly annoying to those whose storage room is limited and whose orders have been delayed by shippers.

All-rail trade is fairly active. Prices for the poorer grades of coal are very low; those for medium and higher grades better, as producers are endeavoring to keep figures up as much as possible.

Transportation from mines to tide is very poor, and the car supply is only about 50% of what is needed. In the coastwise market vessels are very scarce at the further lower ports, but as the demand is not active the situation is not particularly aggravating. We quote current rates of freight from Philadelphia: To Boston, Salem and Portland, 75c.; Long Island Sound, 60c.; Lynn and Newburyport, 90c.; Portsmouth and Bath, 80c. Five to 10c. above these rates are asked at the farther lower ports.

Birmingham. Nov. 30.

(*From Our Special Correspondent.*)

A little local trouble at the Belle Ellen mines has been settled and but little time was lost in this State on account of the Thanksgiving Day holiday. There is a good demand for coal and deliveries are being urged. The railroads are doing better now, especially with coal loaded into cars of foreign roads.

There is much development going on in Jefferson, Winston and Bibb counties, while a new mine or two will be opened up in the near future in Tuskaloosa county. Not less than a dozen mines will be opened up before the expiration of another year in the western part of Jefferson county, three or four places already producing a good quantity of coal. In Winston county, Texas parties are prospecting and will shortly have an opening in the coal vein. In Bibb county four new mines are now being planned. The older mines in this State are doing well, and with but few exceptions have a steady production.

There is a good demand for coke and the production is holding up well. The new ovens of the Sloss-Sheffield Steel & Iron Co. at Flat Top, in the western part of Jefferson county, are doing well. Steady prices prevail for coke.

Chicago. Nov. 30.

(*From Our Special Correspondent.*)

The coal business continues good for the season, though not up to the standard of mid-winter, notwithstanding the cold weather of the last two weeks. Anthracite is selling well, and there is no difficulty with the supply; the dock bins are overflowing and all the all-rail trade is not hampered so much by the railroad conditions as was feared early in the autumn. With the closing of lake navigation, by the expiration of insurance December 5, the all-rail supply will be of much greater importance than it is now. Prices on anthracite are firmly maintained—$6.50 for egg, stove and chestnut, and $6.75 for grate. The amount of independent coal in the market is small; some of this coal has been sold for less than the anthracite combination price, but in general the retailer and the consumer pay the standard prices willingly, in thankfulness at the change from last year. There is yet no talk by the controllers of the anthracite supply of higher prices.

There has been a continuation of the steady and large demand for the cheaper grades of Indiana and Illinois bituminous. Screenings are worth $1.15@$1.65; run-of-mine brings $1.75@$2.25, and lump $3@$3.25. Brazil block brings $3.75@$4. Hocking is selling well at $3.60@$3.90 for the best steam lump, and $4.25@$4.75 for domestic lump. Smokeless is in light, but steady, demand at $3.65 for run-of-mine, and $4.30 for lump and egg; its popularity does not grow, despite efforts to push it by leading agents. Apparently the new agreement of agents for smokeless mines is holding up the price better than formerly and restricting shipments, but it is predicted by dealers long in the business that it is not likely to last long; natural conditions of trade will, it is said, be against it. Youghiogheny and Pittsburg are in fair to light demand from day to day, and continue to bring $3.25@$3.50. Smithing sells well at $4@$4.25, and cannel is in good demand at $5@$5.50.

If the present cold weather continues, uninterrupted by a warm spell, both anthracite and bituminous will doubtless be in better demand in the coming week. The Colorado strike is already sending considerably more bituminous westward, and local dealers expect much business on account of it, if the strike continues.

Cleveland. Dec. 1.

(*From Our Special Correspondent.*)

The lake coal trade is about at an end for the year. It is now apparent, however, that there is a considerable quantity of coal yet to be moved, and it is beginning to look as if the movement up the lakes would continue until nearly Christmas, as it has done in the past. The market is growing lively, because the supply of tonnage is being restricted and the demand is increasing, most of the Lake Erie ports having cargoes to be moved. The first advance in freight rates has been made for the season within the past week, the carrying charges to the head of Lake Superior having jumped from 50c. to 75c. Vessel owners are now predicting $1 coal before the end of the season.

The situation in the steam coal trade does not change much, except to grow unfavorable to the operator. Production continues at a very high rate of speed, but the consumption does not keep abreast of it. Factories have been closing down for their winter invoices, which has eased the demand for coal, and in addition many of the shops are running short hours. The prices have not changed much. Ohio coal brings $1.10, at mine, for run-of-mine, while Pittsburg coal is bringing about $1.30, at mine, for run-of-mine.

The domestic demand increases somewhat with the coming of more severe weather and the market is stronger, but not to the point where prices have been changed, the present basis being considered high enough. Massillon coal is bringing $3.50 at the mine for lump.

The coke situation is likewise easier. The production has been fairly heavy and the consumption light, with the lessening of activity in the furnaces and foundries. Good Connellsville coke is bringing $2.65 at the oven, while the high sulphur cokes are bringing $2.40 at the oven.

Pittsburg. Dec. 1.

(*From Our Special Correspondent.*)

Coal.—Lake shipments are practically closed, and according to the latest estimate, the supply at the upper lake ports is fully 2,000,000 tons in excess of last season. The demand here is fairly good and prices for immediate delivery are being fairly well maintained. Production during the week has been curtailed by the Pittsburg Coal Co. and a number of independent concerns. The Pittsburg & Buffalo Co., the largest independent producer in the district, is operating all of its mines in full, having sold its entire production for the year.

Connellsville Coke.—Production, shipments and prices of Connellsville coke are lower this week. Furnace coke is quoted at $1.60@$1.75 and foundry at $2.40@$2.65. The committee of seven operators appointed to consider the regulation of trade and prepare a plan to be submitted at a general meeting of operators, held two sessions during the week. It was announced that the committee would make a report at a meeting to be held to-day, but for some reason the meeting has been postponed. It is understood the committee has decided to divide the Connellsville region into three districts and fix prices for each district separately. The *Courier*, in its last report, gives the production for the previous week at 109,366 tons. The shipments for the week aggregated 5,118 cars distributed as follows: To Pittsburg and river tipples, 2,258 cars; to points west of Pittsburg, 1,645 cars; to points east of Connellsville, 1,215 cars.

San Francisco. Nov. 26.

(*From Our Special Correspondent.*)

The coal market is quiet, with somewhat larger arrivals of Australian coal. A good deal of Japanese coal has come here this season, nearly five times as much as the small amount received last year. Prices are unchanged, Rocky Mountain coal still holding the advance recently on account of the strikes.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.59; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite; $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is still nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite; $8.50 for cannel; $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Dec. 2.

Exports of coal and coke from the United States, for the 10 months ending October 31, are reported by the Bureau of Statistics of the Department of Commerce and Labor, as below, in tons:

	1902.	1903.	Changes.
Anthracite	638,137	1,803,820	I. 1,165,683
Bituminous	4,526,967	5,284,948	I. 757,981
Total coal	5,165,104	7,088,768	I. 1,923,664
Coke	317,888	344,903	I. 27,015
Totals	5,482,992	7,433,671	I. 1,950,679

The coke went chiefly to Mexico. The distribution of the coal exports was as follows:

	1902.	1903.	Changes.
Canada	3,722,603	5,686,192	I. 1,963,589
Mexico	457,095	668,650	I. 211,555
Cuba	316,038	331,158	I. 15,122
Other West Indies	260,708	179,160	D. 81,548
France	29,766	3,320	D. 26,446
Italy	86,530	41,285	D. 45,245
Other Europe	67,296	21,757	D. 45,539
Other countries	225,070	157,246	D. 67,824
Totals	5,165,104	7,088,768	I. 1,923,664

The increase in exports was chiefly to Canada. The exports to European countries show material decreases. The Canadian trade was considerably below the normal amount last year.

Imports of coal into the United States, for the 10 months ending October 31, were as follows:

	1902.	1903.	Changes.
Canada	1,341,930	1,331,659	D. 10,271
Mexico	7,959	5	D. 7,954
Great Britain	137,546	1,264,534	I. 1,126,988
Other Europe	753	431	D. 322
Japan	8,176	59,034	I. 50,858
Australia	291,907	376,565	I. 84,658
Other countries	299	1,019	I. 720
Totals	1,788,570	3,033,247	I. 1,244,677

Of the coal imported from Great Britain, 145,616 tons were classed as anthracite, against 18,769 tons last year. The increase was chiefly in imports on the Atlantic Coast, in the early part of the year.

Messrs. Hull, Blyth & Co., of London and Cardiff,

report, under date of November 21, that there is no change with regard to the Welsh coal market, which remains steady but quiet for all descriptions. Quotations are: Best Welsh steam coal, $3.72; seconds, $3.66; thirds, $3.54; dry coals, $3.48; best Monmouthshire, $3.30; seconds, $3.18; best small steam coal, $2.10; seconds, $1.98; other sorts, $1.80.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The freight market is quiet and rates seem a trifle weaker. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.20; Constantinople, $1.08; Las Palmas, $1.38; St. Vincent, $1.56; Rio Janeiro, $2.28; Santos, $2.46; Buenos Aires, $1.68.

IRON TRADE REVIEW.

New York, Dec. 2.

Somewhat more business is developing in pig iron, both in the East and in the Central West. It is chiefly in moderate sized lots for early delivery, and prices are lower. Bessemer iron has sold in Pittsburg as low as $13.75 at furnace, although most of the business has been done at $14. No. 2 foundry, Valley furnace, has sold at $14.25, delivered in Pittsburg. There is a report that Southern iron is bringing from 25 to 50c. more than it did recently; nevertheless, sales have been made in the East on a basis of $9, Birmingham, for No. 2 foundry, and as low as $8, Birmingham, for gray forge.

In finished iron and steel business has been quiet. The spurt in bars, which was brought about by the recent reductions, has apparently passed, demand being pretty well satisfied. In plates and structural steel buyers are holding back for the reductions which the pools have refused to grant, but which, it is felt, are sure to come. Some heavy contracts for structural material and ship material are in sight, but there seems to be no disposition to place them until lower prices are reached. The steel rail situation is unchanged.

All thinggs considered, matters are slightly more encouraging. The last month of the year is always a dull one in the market, and the fact that there is a demand for material for early delivery shows that there is still business to be done. Very much, however, depends upon prices.

Exports and Imports.—Exports of iron and steel, including machinery, from the United States, for the 10 months ending October 31, were valued by the Bureau of Statistics at $81,696,786, against $82,016,750 in the corresponding period in 1902; a decrease of $319,964 only. The leading items of exports were as follows, in long tons:

	1902.	1903.	Changes.
Pig iron	24,574	13,534	D. 11,040
Bar iron and steel	27,295	31,659	I. 4,454
Rails	65,266	17,990	D. 47,276
Sheets and plates	15,442	14,633	D. 809
Structural material	49,783	25,093	D. 24,690
Wire	84,081	88,205	I. 4,124
Nails	30,035	35,264	I. 5,229

Exports of iron ore were 73,247 long tons, against 86,806 tons in 1902; a decrease of 13,559 tons. Most of this ore went to Canada.

Imports of iron and steel into the United States for the 10 months ending October 31 were valued at $37,204,609, against $31,987,868 in 1902; an increase of $5,216,741 this year. The leading items of these imports were, in long tons:

	1902.	1903.	Changes.
Pig iron	406,610	566,090	I. 159,480
Ingots, billets and blooms	222,011	253,554	I. 31,543
Scrap iron and steel	86,859	77,939	D. 8,920
Bar iron and steel	23,520	36,832	I. 13,312
Rails	49,388	90,094	I. 40,706
Wire-rods	16,692	17,036	I. 344
Tin-plates	49,587	40,171	D. 9,416

Imports of iron ore were 897,030 long tons, against 997,531 tons in 1902, showing a decrease of 100,501 tons. These imports were mainly from Cuba.

Birmingham. Nov. 30.

(From Our Special Correspondent.)

It was announced during the last of the past week by officials of the larger iron interests in this section that a turn for the better was noted in the iron mart as far as prices were concerned. Large sales of iron have been made in Alabama at low prices, but it is now given out that instead of the manufacturers hunting for customers the customers are hunting the manufacturers. There is no denial that some iron has sold as low as $9 per ton for No. 2 foundry. It is given out that small lots of No. 2 foundry have been sold already at $9.75, while the bulk is selling at $9.50 per ton flat. President J. C. Maben states that the Sloss-Sheffield Steel & Iron Co. sold during the month of November more than 80,000 tons of pig iron. The Sloss-Sheffield Co. has six furnaces in steady operation, their daily average each being about 200 tons. The company had several weeks ago about 100,000 tons of surplus iron in their yards. The extraordinary sales caused some of the surplus iron to be worked off. The Tennessee Coal, Iron & Railroad Co., the Republic Iron & Steel Co., the Lacey-Buek Iron Co., the Woodward Iron Co. and other concerns in this section, also, have been selling quantities of pig iron. The announcement that the iron prices had taken a turn for the better gives much encouragement throughout the iron manufacturing section of the South.

The new furnace of the Alabama Steel & Wire Co. at Gadsden, Ala., is nearing completion and should be ready for the torch in the next few weeks. J. J. Shannon, who is in charge of the construction of this furnace, is anxious to put the plant in operation at the very earliest moment, as he has made a contract to go with the Sloss-Sheffield Steel & Iron Co. as general manager of furnaces. His contract with the Alabama Steel & Wire Co. continues until the first furnace is in blast.

There is no improvement in finished iron and steel circles hereabouts. The big steel plant of the Tennessee Coal, Iron & Railroad Co. at Ensley is doing but little. The rolling mills of the Republican Iron & Steel Co. in Birmingham are as quiet as they could possibly be. The mills of the Tennessee Co. at Bessemer, and those of the Republic Co., at Gate City, are in operation.

It is announced that Philadelphia parties will erect a plant for the manufacture of electric cars and registers in Ensley, the steel suburb of Birmingham. Something like $250,000 will be expended in putting up the plant. The car-wheel works in this district is working about half time.

Chicago. Nov. 30.

(From Our Special Correspondent.)

The skies look more and more propitious to the seller of pig iron; sales in the last week have increased, though they continue to be of the quick-delivery, small-lot kind. Southern is the favorite with buyers, at $9@$9.25 Birmingham, or $12.85@$13.10 Chicago; Northern continues to bring $14@$14.50. It would be rash to prophesy that the turning point has come, but it certainly looks like it. From the inquiries and orders of this, the first day of the new week, it is very probable that this week will show a gain over last week in the total number of sales and their volume in tonnage.

Northern furnaces seem to have the better of the situation, but their proprietors claim to be making iron at a loss, and would welcome an accident that would compel them to shut down, without breaking their contracts. Cheaper conditions of production generally will rule after the beginning of the new year, the prospect of which does not seem this year to make any difference to the buyer.

Coke is now fairly regulated to the needs of the local trade, and holds at about $5.

Cleveland. Dec. 1.

(From Our Special Correspondent.)

Iron Ore.—The lake market is over for the season, the last shipments having been made away from the head of the lakes to-day. The docks are congested and it will be a good while before all of the cargoes will be removed. No meeting has been called to fix the ore prices for next year, but it is understood that the question is being discussed, a large element in the Ore Association favoring a reduction in view of present market conditions.

Pig Iron.—The buying of foundry for spot delivery is heavier and the tendency to cover part of next year's requirements is more marked. It is evident, however, that buyers are still a little timid. The southern situation helps northern furnaces, the stacks being well filled with orders and their stock being depleted. They are stiffening on the price, too, holding now for $9.25 Birmingham as a minimum. This has thrown a larger amount of business on the northern stacks, which are also getting a little stronger in their prices. It is evident, however that this will be a dull month, and even with the restricted production it will be difficult to keep from piling iron. In the meanwhile Northern pig is being sold at $14 for No. 2 foundry in the Valleys. The furnace workmen show a disposition to accept lower wages that work may be resumed. Bessemer and basic are about off the market, being quoted nominally at $14.50 Pittsburg.

Finished Material.—The market has eased off again, after having had a slight revival for the past two weeks. The leader continues to be the steel bar trade. It is evident now, however, that the business which was brought out by the reduction in the prices of that material had been held over from the period during which prices were in question, and there is not enough now in the situation at the end of the year to sustain the activity. Prices hold steady at 1.30c. Pittsburg for bessemer and 1.40c. Pittsburg for open-hearth. The bar iron situation has not improved materially, being still weak, with scant business and some talk of a cut in prices, which has not been verified. The market is still represented by 1.30c. Youngstown. The sheet trade shows some signs of easing off. The quotations continue to be as follows: For No. 27 black sheets out of stock as a basis, 2.50c.; for No. 27 one-pass cold-rolled in car-lots at the mill, 2.35c.; galvanized sheets are sold 70, 10 and 2½ off list out of stock.

The report that the prices of structural and plates are to be cut has been generally spread through the market and finds a number of believers. It has been so strong of late that some business is being held back, although it is a question how much business would be brought out by a reduction. The ship-building industry is at a standstill because this reduction has not been forthcoming. The prices still hold at 1.60c. Pittsburg for structural and plates.

Old Material.—Scrap dealers are not selling from their yards, but are doing a commission business at sacrifice prices. The market is dull and unsteady.

New York. Dec. 2.

Pig Iron.—A little more business is reported, mainly in small lots for early delivery. Southern iron-makers are reported to have advanced No. 2 foundry 50c. a ton, but there has been no change here. We quote as follows, for northern irons, good brands: No. 1X foundry, $15.25@$15.50; No. 2X $14.50@$14.75; No. 2 plain can be had for 50c. less; while gray forge is selling around $13.50. For Southern irons, on dock, quotations are: No. 1 foundry, $13.50; No. 2 foundry, $12.75, with lower grades in proportion. No. 1 soft can be had at about $13.50 and No. 2 soft, at $12.75; while gray forge may be quoted somewhere around $11.50.

Bar Iron and Steel.—The market continues quiet. Common bars are selling at 1.40c. in large lots, with steel at about the same. Business is on a retail scale only.

Plates.—Demand is very light, and is for small lots. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.83c.; flange, 1.95@2.05c.; marine, 2.10@2.15c. Buyers are still holding back for reductions.

Structural Material.—There is no change in demand. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. Very little is doing, however, as buyers look for reductions in prices. Some large contracts are in sight, but are being held back for the present.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight. No business is reported.

Philadelphia. Dec. 2.

(From Our Special Correspondent,)

Pig Iron.—The business in pig iron has not improved to the extent that the low quotations and the offerings of good irons at very moderate prices seem to demand. The rumor that Alabama iron has advanced 50c. per ton is not regarded here as altering the general situation. Our leading makers are still hanging back, and the stronger concerns are making no effort whatever to market their product. The same policy continues among buyers of asking the price of an ox and deciding to take a beeksteak. Buyers, when consulted as to the danger of pursuing this policy indefinitely, simply answer by saying that iron is plenty, and there is no occasion for taking any chances. Producers, when asked for their very best opinion on the situation, say substantially that a reaction is the logical outcome of the present situation, and they appear to prove it to their satisfaction by figuring out a consumptive capacity in excess of present distribution and production. Be this as it may, the buyers of this territory are absolutely indifferent, and nowhere are they showing any desire to carry more stock than is necessary to see them through the work in hand or in sight. Pig iron quotations never meant as little as they do now. The range of quotations was never as wide. There is neither a decline nor an advance. A good deal of attention is being paid to what is going on in Alabama. Quotations may be given approximately as follows: No. 1 X foundry, $16; No. 2 X foundry, $15; No. 2 plain, $14.50; No. 2 Southern by rail, $13.25@$13.50, or on dock, $13; standard forge, $14; basic, $14.

Steel Billets.—It is confidently believed to-day that another break in billets is not far off. Quotations may be given at $24 to $25, according to the purposes for which the steel is wanted.

Merchant Bar.—The cut in steel bars has not brought the business that was counted on. The business done is altogether of a retail nature. Iron bars are quoted down to 1.35 delivered; steel bars 1.45.

Sheets.—As a result of the indifferent demand, there is an accumulation in progress at most of the sheet mills, which may result at the close of the year in throwing off some producing capacity.

Merchant Steel.—The movement in merchant steel has suddenly fallen off, at a time when the contrary course was anticipated. Open-hearth spring steel is quoted at 2c. at mill; tire steel, 1.50c.; tool steel, 6.5c. to 9c., according to grade.

Pipes and Tubes.—Business in this branch has fallen off, even the smaller consumers having decided to make no further purchases until after the holidays.

Plates.—Agents of manufacturers are indulging in the hope that the turn of the year will introduce better conditions, but a fair review of the situation does not warrant this hope. Tank steel is quoted at 1.75c. for ¼-inch; heavier, from 1.85c. to 2c. Boiler plate is quoted at 1.85c.; commercial fire-box, 1.95c.; locomotive fire-box, 2.25c. in large lots. But these quotations do not mean much, as nothing is selling that way.

Structural Material.—Some big orders will be placed in structural steel very soon. Large requirements are now being figured upon, and more work is coming in sight. Beyond this nothing can be said.

Steel Rails.—The steel rail situation will be strengthened according to our people by large sales abroad, but these rosy views are placed more on anticipation than on facts.

Old Rails.—Old iron rails are quoted at $16; old steel at $12.

Scrap.—So far as business is concerned scrap quotations might as well be omitted. Our scrap people are tired waiting for buyers to come in.

Pittsburg. Dec. 1.

(From Our Special Correspondent.)

There is a noticeable improvement in the market for some lines of finished steel. Not that there is any heavy buying, but the fact that any sales are made at all in a usually dull month, with conditions disturbed, is considered very encouraging. But little new business is placed in December, as a rule, but so far a number of inquiries have been received, and there is every indication that a large number of small orders will be placed before the first of the year. It is not expected that any heavy buying will be done for at least two months, particularly for structural material. The big steel car interests in this district have inquiries for steel cars aggregating about 6,000 cars, and it is believed the contracts will be closed within 30 days. As 10 tons of steel plates are used in the manufacture of one car the contracts that are likely to be closed will represent orders for 60,000 tons of steel plates. The Pressed Steel Car Co. has a long-term contract for plates with the Carnegie Steel Co. based on the selling price of pig iron. The Standard Steel Car Co., it is understod, also has an arrangement for its plate requirements. There is no further talk of reductions in rails, structural shapes and plates. There has been no change in prices in these lines for over two years, and, as they constitute nearly one-half of the finished steel production of the country, the fact that prices are not to be cut is taken as an encouraging sign. A general resumption of activity is not expected so late in the year, but there seems to be a general belief that trade will brighten early in the new year. There is absolutely no truth in the rumors that a further reduction in steel billets is likely to be ordered at the meeting of the billet pool scheduled to be held in New York on December 18. There is nothing in the trade to warrant another cut. The object of the meeting, it is announced, is to consider the question of continuing the pool throughout 1904. Confidence in the steel market is gradually being restored, and mills in the Pittsburg district report that there has been an unusual number of small orders placed during the past week for plates, shapes, steel bars and sheets. All the new orders are for immediate consumption.

The pig iron market is in bad shape, and there is but little indication of an improvement before the first of the year. Production this week in the Pittsburg and surrounding districts has been curtailed fully 55%, and it is likely to be greater on January 1. Prices have declined still further, and it is possible that some consumers may take advantage of the low rates to place orders for future delivery, if this can be done. Two contracts have been made during the week for bessemer pig iron. One was for 3,000 and the other was for 2,500 tons. The price was not named, but it is understood that it was less than $14.50, Valley furnace. It is known that a number of small lots of bessemer were sold within the past few days, and that as low as $13.75, Valley, was done. It is not likely that this price would be accepted, only for immediate shipment. In forge and foundry iron prices also have dropped. There has been more activity in Southern iron during the past week than usual, and the prices are the lowest named for a long time. Southern foundry of the No. 2 grade sold at $9, Birmingham, which is equal to $13.35, delivered at Pittsburg. The best that can be done for Northern foundry is $14.25. Furnace No. 1 of the Duquesne group was blown out yesterday, and will be entirely rebuilt. This furnace has had a remarkable record. It had been in continuous operation for seven years, four months and 15 days, which is the longest run made by any furnace by three years. During its operation it produced 1,287,500 tons of iron, or an average of 478 tons daily.

The reports received at the headquarters of the Amalgamated Association of Iron, Steel & Tin Workers show that many union sheet and tin-plate plants are idle, or operating irregularly, while the non-union works are running full. The lodges have voted favorably on the proposition to hold a special convention to consider the question of removing the limit of output in the sheet mills, and to take action on other matters that will permit the operation of union mills. A call for the convention was expected, when President T. J. Shaffer returned from the convention of the American Federation of Labor held at Boston. Shaffer got back last week, but is reported sick at his home, and nothing likely will be done for another week. It is understood arrangements are being made to hold the convention on December 10.

Pig Iron.—It is estimated that within the past ten days from 6,000 to 7,000 tons of bessemer pig iron have been sold at prices ranging from $13.75 to $14.50, Valley furnaces. The low rate, it is understood, is for small lots for immediate delivery. A few lots of foundry No. 2 sold at $14.25, Pittsburg, and it is reported that a number of sales of Southern foundry were made at $9, Birmingham, or $13.35 delivered in this district. Northern forge is quoted at $12.75@$13.25, Pittsburg, and a few small sales of Southern forge are reported at $12.35, Pittsburg, or $8, Birmingham.

Steel.—Bessemer and open-hearth billets are held firmly at $23, but there has not been any sales of importance. Some business has been done in sheet bars at $24. The plate trade is improving, and prices are firm at 1.60c. Steel bars are still quoted at 1.30c.

Sheets.—The new prices on sheets are firmly maintained, chiefly for the reason the independent producers cannot meet thm. Car-load and larger lots are quoted at 2.35@2.40c. for black and 3.40@3.45c. for galvanized No. 28 gauge.

Ferro-Manganese.—Trade is dull, and $48 continues to be quoted for domestic 80 %.

Cartagena, Spain. Nov. 14.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Since our last report there have been shipped one cargo, 3,700 tons dry ore, and one cargo, 1,900 tons manganiferous ore, both to Great Britain. There is no improvement in the position of the market, and more mines have been shut down waiting for better prices. There is very little surplus and no stocks on hand for prompt delivery over the supplies that have been contracted for. The Subida Iron Ore Company, Ltd., has loaded a cargo of ore from La Calera for Glasgow.

Prices remain nominally at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50% ore; 7s. 3d.@7s. 9d. for special low phosphorus; 8s. 9d. for special ore; 9s. 3d. for 58% specular ore. Magnetic ore, 60% iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20% manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43% sulphur and 40% iron, are quoted at 10s. 6d. per ton, f. o. b. Cartagena. Shipments for the week were 160 tons to Swansea.

CHEMICALS AND MINERALS.

New York, Dec. 2.

There has been a slight improvement in business since the Thanksgiving holiday last week, but consumers do not appear over-anxious to load up before their annual inventory has been taken. Some difficulty is being experienced in collections in certain quarters, but no apprehension is felt that the bad uebt accounts will be greatly enlarged as this has been a prosperous year for many industries.

New contracts for 1904 are become scarcer, as most of the large consumers have already placed their orders.

A gratifying feature of the chemical trade is the increasing apathy among speculators, who have been taught a lesson by this year's low prices. Of course, there are speculative purchases still being made, but the profits are comparatively small, and in some cases losses have been shown, as large stocks had to be carried for an indefinite period.

The barytes market is showing a larger demand than the production of prime white grades. It is intimated that the greater part of the domestic supply has been contracted for some time ahead, and abroad the larger factories have sold their output for 1904. Greater activity in the pigment trade this year has been responsible for higher prices, though credit should also be given to those who are developing new uses for bartyes.

The consumption of foreign chemicals and minerals imported into the United States in the 10 months ending October 31 was approximately as follows; the figures are compiled from official returns by the government:

	Imports.	Re-exports.	Consumption.
Asphalt, tons	141,784	1,062	140,722
Bleaching powder, lb.	90,837,528	724,162	90,113,366
Brimstone, tons	146,456	848	145,608
Cement, lb.	825,179,043	9,355,006	815,824,037
Clay, tons	162,028	26	162,002
Graphite, tons	13,907	60	13,847
Phosphates, tons	114,530	....	114.530
Potash, chlorate, lb.	390,713	19,105	371,608
Potash, muriate, lb.	126,521,673	284,694	126,236,979
Potash, nitrate, lb.	12,447,779	354,921	12,092,858
Pyrites, tons	337,510	1,330	336,180
Salt, lb.	273,998,588	7,677,340	266,321,248
Soda ash	18,456,831	26,706	18,430,125
Soda, caustic	2,421,009	951,066	1,469,943
Soda, nitrate, tons	222,759	3,797	218,962
Soda, sal, lb.	3,014,685	26,706	2,987,979

Compared with the corresponding ten months last year increases are shown in all substances excepting the heavy chemicals, and graphite and salt—products that are being marketed in increasing quantities in this country.

Exports of domestic products in the 10 months ending October 31, were as follows:

	1902.	1903.	Changes.
Acids	$196,194	$187,129	D. $9,065
Cement, bbls.	304,030	237,614	D. 66,416
Copper sulphate, lb.	30,027,816	17,584,974	D. 12,442,842
Lime, acetate, lb.	51,894,563	50,014,523	D. 1,880,040
Lime, bbls.	33,410	47,387	I. 13,957
Phosphates, tons	699,212	652,133	D. 47,079
Pot and pearl ashes, lb.	1,368,727	1,077,417	D. 291,310
Salt, lb.	8,879,132	20,113,428	I. 11,234,296
Zinc oxide, lb.	9,065,747	11,448,824	I. 2,383,077

It is noteworthy that decreases are shown in products that have heretofore held a prominent place in our export trade. There have also been numerous exports; including bicarb. soda, asbestos, talc, etc., which are tabulated only once a year by the government.

It is interesting to add that in the 10 months ending October 31, 1903, there were exported from New York 4,895,587 lb. bicarb. soda, of which the Argentine Republic received 1,145,340 lb., Great Britain, 1,050,158 lb.; Australia and New Zealand, 909,240 lb., and Japan, 517,200 lb., while the balance went to a number of other countries. The caustic soda exports amounted to 3,046,077 lb., of which Japan took 1,438,643 lb. Zinc oxide exports were 50,008 bbl., of which Great Britain received 28,911 bbl., and France, 11,900 bbl.

In the past week 35 cases (3,920 lb.) potassium bromide were shipped from New York to Yokohama, Japan.

Cyanide.—Aside from regular contract shipments the trade shows no change, and the price remains at 20c. per lb. for potassium cyanide, f. o. b. New York.

Bleaching Powder.—Consumers who are accustomed to buy from hand to mouth will find little difficulty to pick up odd lots of foreign bleach at as low as $1.05 per 100 lb., f. o. b. New York. The few consumers still uncovered for next year can place their contracts for prime British and American bleach at $1.25 per 100 lb., f. o. b. Atlantic seaboard, and for Continental, at $1.20. Of course sellers of 'below test' grades will quote lower prices than those given above.

Copper Sulphate.—The market has weakened intuitively, and at present blue vitriol can be had as low as $4.70 per 100 lb., f. o. b. works. At one time some of the large sellers said $4.75 was the general quotation. However, since the large consumers are protected by long-time contracts at lower prices than those quoted, present fluctuations are not attracting much attention. An encouraging situation is that producers are becoming less inclined to add to the visible supplies in anticipation of an improved demand; on the contrary, the tendency is to keep the output at a level where stocks will not be large enough to influence prices. Doubtless the decreasing export trade has dictated this policy.

Acids.—Further 1904 contracts for muriatic and sulphuric acid are reported at quotations, and with continued high prices for raw materials manufacturers are likely to maintain their position for some time to come.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Muriatic, 18°	$1.50	Oxalic, com'l	$5.00@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20 00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—As had been expected, the recent heavy arrivals have weakened spot prices until best unmixed seconds can readily be had at $22 per ton. which is also asked for shipments. Best thirds are nominally 50c. less than seconds.

Pyrites.—Somewhat quieter this week. Business is confined to deliveries on contracts.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@12c. per unit for lump, and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Consumption continues exceptionally good, and it looks as if stocks will not be sufficient to meet the current demand. Prices are therefore likely to go higher. Spot is quoted at $2.25 per 100 lb.; December-January, $2.10; February, $2.075; March-April, $2.05; May-June, $2,025; July-December, $2.00.

The statistical position of nitrate of soda in the world for the nine months ending September 30 is shown below, in long tons:

	1902.	1903.	Changes.
Production	976,591	1,073,000	I. 96,409
Exports from So. Am.	869,769	880,754	I. 10,985
World's consumption	1,159,591	1,236,227	I. 76,636

A notable change this year is the increase of nearly 7% in consumption. This growth, however, has been less rapid than the production, which shows an increase of nearly 10%. Of the 93 *oficinas* in the combination, 15 were idle at the end of September.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write under date of October 3 that there has been very little interest on the part of exporters to operate. Owing to the small quantity of nitrate disposable for this year, producers are holding out for much higher prices than current freights warrant. Sales of 95% have been effected for October to November at 7s. 1d.@7s. 2d.; December, 7s ¼d.@7s. 2d.; January, 6s. 10d., and in refined for April at 6s. 9d., all alongside terms. Exports for the first nine months of this year amount to 19,464,000 qtls., against 20,277,000 qtls. during the corresponding period last year. We quote 95%, October, 7s. 1d.@7s. 2½d.; November, 7s. 1d.@7s. 1½d.; December, 6s. 11½d.@7s.; January to March, 6s. 9½d., and 96%, October to December, 7s. 3½d., all ordinary terms sellers. The price of 7s. 1d. per qtl., with an all-round freight of 15s., stands in 8s. 7½d. per cwt., net cost and freight, without purchasing commission. Reported sales for the fortnight are 198,500 qtls., and re-sales, 99,000 qtls.

Sulphate of Ammonia.—Good gas liquor is selling at $3.05@$3.075 per 100 lb., f. o. b. New York. Business is comparatively small.

Phosphates.—Aside from exports on regular contracts and an occasional new charter for vessel room, nothing of interest can be reported.

The exports of Florida high-grade rock from Savannah, Ga., in October amounted to 19,414 tons, principally to Germany. Since January these shipments have aggregated 123,538 tons, which is 31,276 tons less than for the corresponding 10 months in 1902.

Phosphates.	Per ton. f. o. b.	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.25@$7.50	6¾@7⅝d.	$10.53@11.70
*Fla. land peb. (68@73%)	3.75@ 4.00	5⅛@5½d.	7.70@ 8 05
†Tenn. (78@82%) export	4.00@ 4.25	6¼@7d.	10.40@11.20
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn. 75% domestic	3.50	.....	.....
†Tenn. 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn. 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡So. Car. riv. rk. (55@63%)	2.75@ 3.00	4⅝@5⅛d.	5.55@ 6.60
Algerian (63@70%)	.....	5¼@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	4⅝@5¾d.	5.55@ 6.90
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80 85%)	.....	7⅛@8¼d.	12.38@13.61
Ocean Isle (82@88%)	.....	8 @9⅛d.	13.60@14.45

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Nov. 17.

(Special Report of Joseph P. Brunner & Co.)

Most lines of heavy chemicals are moving off fairly well on contracts, but new business is quiet and prices are generally well maintained.

Soda ash is in fair request, at usual range as to destination. For tierces nearest values for either prompt or forward delivery may be called about as follows: Le Blanc ash, 48%, £5@£5 10s. per ton, net cash; ammonia ash, 48%, £4 5s.@£4 10s. per ton, net cash. Le Blanc ash, 58% £5 10s. £6 per ton, net cash; ammonia ash, 58% £4 10s.@£4 15s. per ton, net cash. Soda crystals are moving off mostly at £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is very steady, quotations for any position being as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s. 76%, £10, 10s. per ton, net cash. Special quotations for export to the continent and a few other quarters.

Bleaching powder is inactive on spot, but prices are rather firmer, at about £3 15s.@£4 5s. per ton net cash for hardwood packages, as to market.

Chlorate of potash is flat at 2½d. per lb., net cash, for English make.

Bicarbonate of soda is firm at £6 15s. per ton, less 2½% for finest quality in 1 cwt. kegs, with usual allowances for larger size packages; also special terms for a few favored markets.

Sulphate of ammonia is slow, and prices continue to drop, the nominal range for good gray, 24@25% in double bags, f. o. b. here, being about £12 2s. 6d. @£12 5s. per ton, less 2½%.

Nitrate of soda is steady on spot at £9 17s. 6d.@ £10 5s. per ton, less 2½% for double bags, f. o. b. here, as to quality and quantity.

METAL MARKET.

New York, Dec. 2.

Gold and Silver Exports and Imports,

At all United States Ports in October and Year.

Metal	October.		Year.	
	1902.	1903.	1902.	1903.
Gold:				
Exports	$1,460,829	$352,177	$32,457,158	$41,889,028
Imports	11,118,446	5,015,656	36,024,938	36,656,328
Excess	I. $9,657,617	I. $4,663,479	I. $3,567,790	E. $5,232,700
Silver:				
Exports	4,382,566	3,145,532	39,963,105	28,053,967
Imports	2,798,736	2,733,655	21,502,580	19,334,424
Excess	E. $1,583,830	E. $411,877	E. $18,460,525	E. $8,719,033

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending December 2 and for years from January 1.

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week	$81,300	$2,493,706	$981,020	$58,285	I. $1,490,671
1903	31,739,485	15,841,149	30,178,405	3,253,332	E. 42,823,409
1902	25,023,292	2,620,628	24,487,811	1,143,228	E. 45,748,346
1901	44,160,739	4,614,093	29,164,481	2,432,092	E. 66,282,035

The arrivals of gold were mostly from Europe. The silver exported went chiefly to London.

While business still remains in a somewhat uncertain condition, matters are looking much better, especially in the West. A further amount of $1,800,000 gold has been taken in London for New York account, making about $11,700,000 coming in at the present movement, of which nearly $8,000,000 has already arrived.

A somewhat unusual transaction is noted by the cable announcement that 1,500,000 yen—about $750,000—have been taken in Japan for shipment to San Francisco. It is some years since Japanese gold has come to this country.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending November 28, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and deposits	$876,169,200	$879,826,000	$880,839,700
Deposits	940,668,500	883,836,800	841,552,000
Circulation	31,975,000	45,432,800	46,036,500
Specie	176,186,500	168,840,200	152,241,200
Legal tender	72,395,200	67,905,300	64,272,000
Total reserve	$248,581,700	$236,745,500	$216,513,200
Legal requirements	235,167,125	220,959,200	210,388,000
Balance surplus	$13,414,575	$15,786,300	$6,125,200

Changes for the week were increases of $13,400 in circulation, $1,481,200 in legal tenders, and $2,218,850 in surplus reserve; decreases of $6,394,600 in loans and discounts, $5,781,400 in deposits, and $712,700 in specie.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902.		1903.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	$168,840,200	.....	$152,241,200	.....
England	164,774,355	.....	159,466,180	.....
France	508,672,035	$221,486,810	479,506,295	$221,815,420
Germany	166,240,000	61,485,000	172,475,000	60,600,000
Spain	71,650,000	98,500,000	72,580,000	94,655,000
Neth'lands	23,489,500	32,472,000	20,569,000	31,819,500
Belgium	15,463,335	7,731,665	16,193,335	8,096,665
Italy	83,735,000	10,416,000	75,450,000	16,525,500
Russia	374,185,000	32,605,000	404,105,000	33,080,000
Austria	231,665,000	61,090,000	232,680,000	61,065,000

The returns of the Associated Banks of New York are of date November 28, and the others November 26, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has been dull, with lower quotations, on cessation of buying by India Government. The market closes firm, however, at 26 7-16d. upon resumption of buying orders from the East.

The United States Assay Office in New York City reports receipts of 33,000 oz. silver for the week.

Indian exchange continues firm, and the Council bills offered in London were taken at an average of 16.03d. per rupee. There are reports of further buying of gold in Australia for Indian account. The shipments of silver have been somewhat heavier, but still continue rather light.

Shipments of silver from London to the East for the year up to November 19 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£5,698,730	£5,897,530	I. £198,800
China	162,500	310,060	I. 147,560
Straits	756,470	746,879	D. 9,591
Total	£6,617,700	£6,954,469	I. £336,769

Receipts for the week, this year, were £117,000 in bar silver and £32,000 Mexican dollars from New York, £13,000 silver from the West Indies, and £5,000 from Australia; total, £167,000. Shipments were £176,200 in bar silver and £46,000 Mexican dollars to Bombay, £25,000 bar silver to Singapore, and £5,000 to Madras; total, £252,200.

The coinage executed at the mints of the United States in November is reported by the Bureau of the Mint, Treasury Department, as follows:

Denomination.	Pieces.	Value.
Double eagles	358,000	$7,160,000
Eagles	120,000	1,200,000
Half eagles	86,920	434,600
Total gold	564,920	$8,794,600
Dollars	163,000	163,000
Half dollars	726,000	363,000
Quarter dollars	2,040,000	510,000
Dimes	3,650,000	3,650,000
Total silver	6,579,000	$1,401,000
Five c	2,757,000	137,850
One c	9,167,000	91,670
Total minor	11,924,000	$229,520
Total coinage	19,067,920	$10,425,120

In addition there were coined 14,981,823 silver pieces for the Philippines, and 1,400,000 silver pieces for Venezuela.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.43	$0.48
Peruvian soles and Chinese pesos	.42	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

1 Nov.-Dec.	Sterling Exchange.	Silver— N. Y. Cts.	Silver— London, Pence.	Copper— Lake, Cts. per lb.	Copper— Electrolytic, Cts. per lb.	Copper— London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter— N. Y., Cts. per lb.	Spelter— St. Louis, Cts. per lb.
26	.....	....	26⅞	.....	.....	55	....	.....	.....	.....
27	4.83⅜	57	26¼	12 @12⅛	11⅞ @12	54¼	26	4.05 @4.10	4.80	4.62½
28	4.83⅜	57	26⅛	11⅞ @12⅛	11¾ @12	....	26	4.05 @4.10	4.75	4.57½
30	4.83⅜	56¼	26¼	11¾ @12	11⅝ @11⅞	54½	25¾	4.05 @4.10	4.67½	4.50
1	4.83¼	56¼	26¼	11¾ @12	11⅝ @11⅞	55	25⅞	4.05 @4.10	4.67½	4.50
2	4.83¼	56⅞	26 7/16	11¾ @12	11⅝ @11⅞	55	26	4.05 @4 10	4.62 @4.67½	4.45 @4.50

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

Copper.—Owing to the fact that leading producers remain constant sellers, the market shows a further decline. Consumers over here are still very apathetic, but very large quantities have been placed abroad, where consumers evidently have been as bare of supplies as most of them are supposed to be on this side. The closing quotations are given as 11¾@12c. for Lake, 11⅝@11⅞c. for electrolytic in cakes, ingots and wirebars; 11⅜@11⅝c. in cathodes; 11½c. for casting copper.

The market for standard copper in London, which closed last week at £54 15s., opened on Monday at £54 10s., advanced on Tuesday to £55, and the closing quotations on Wednesday are cabled as £55@£55 2s. 6d. for spot, £54 12s. 6d.@£54 15s. for three months.

Statistics for the second half of November show a decrease in the visible supplies of 1,300 tons.

Refined and manufactured sorts we quote: English tough, £57@£57 10s.; best selected, £58@£58 10s.; strong sheets, £65@£65 10s.; India sheets, £62@£62 10s.; yellow metal, 6⅛@6¼d.

Imports of copper in October, as reported by the Bureau of Statistics of the Department of Commerce and Industry, were 12,992,877 lb. fine copper and 23,397 tons copper ores and matte, containing 1,697,823 lb. fine copper. This makes a total for the month of 14,690,700 lb. copper. The Bureau has begun to report the copper contents of ores and matte, which is a great improvement. For the 10 months ending October 31 the statement of imports, and of

re-exports of foreign material is as follows, in long tons:

Ores and matte:	1902.	1903.	Changes.
Imports	144,130	231,181	I. 87,051
Re-exports	12,789	5,150	D. 7,639
Net imports	131,341	226,031	I. 94,690
Fine copper:			
Imports	33,274	50,828	I. 17,554
Re-exports	4,520	934	D. 3,586
Net imports	28,754	49,894	I. 21,140

For the earlier months of the year the copper contents of ores and matte were not reported, so that it is necessary to estimate the quantity. Making such an estimate, on the basis of values, we find that the net imports, stated as fine copper, were, approximately, 55,591 long tons this year, against 59,911 tons in 1902; a decrease of 4,320 tons, or 7.8 per cent. This decrease, shown in the face of an apparent large gain in ores and matte, and an actual gain in fine copper, is due to the fact that the first-named imports this year were largely in the form of low-grade ores, while last year much matte was included. The gain in ores was chiefly from Canada; in the imports from Mexico there was an increase in apparent quantities, but a very large decrease in values.

Exports of domestic copper for the 10 months are reported by the Bureau of Statistics as follows, in long tons:

	1902.	1903.	Changes.
Copper ore and matte	16,207	10,244	D. 5,963
Fine copper	139,517	121,476	D. 18,041

Estimating the copper contents of the ores and matte, we find that the total exports, in fine copper, were, approximately, 124,818 long tons this year, against 145,636 tons in 1902; a decrease of 20,818 tons, or 14.4 per cent.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of December 1 and for the year to date, were in long tons:

	Week.	Year.
Austria	257	5,444
Belgium	15	1,170
France	703	20,908
Germany	352	26,622
Holland	1,462	38,259
Italy	27	2,945
United Kingdom	445	16,270
Other countries	...	4,712
Total copper	3,261	116,330
Matte	...	286
Imports—		
Copper	352	24,554
Matte	...	984
Ore	...	39,665

Exports were principally to Holland for Germany, and imports mostly from Great Britain.

Tin.—The market here has been fairly active, and has followed closely the ups and downs of that in London, although some lots have changed hands below the importation point. The ruling quotation is 26c. for spot and futures.

The foreign market which closed last week at £118 15s., opened on Monday at £117 15s., and closing quotations on Wednesday are cabled as £119@£119 2s. 6d. for spot, £120 7s. 6d.@£120 10s. for three months.

Statistics for the month of November show a decrease in the visible supplies of 600 tons.

Imports of tin into the United States, for the 10 months ending October 31, were as follows, in long tons, of 2,240 lb.:

	1902.	1903.	Changes.
Straits	17,253	16,696	D. 557
Australia	262	212	D. 50
Great Britain	12,785	15,068	I. 2,283
Holland	1,176	1,025	D. 151
Other Europe	326	369	I. 43
Other countries	75	39	D. 36
Totals	31,877	33,409	I. 1,532

There was a decrease in imports direct from the East, but an increase in the metal received through British ports. The tin credited to Great Britain is chiefly Straits tin.

Lead continues in fair demand without any special feature. The ruling quotations are given as 3.97½@4.02½ St. Louis, 4.05@4.10 New York.

The foreign market is steady, Spanish lead being quoted at £11 2s. 6d.@£11 3s. 9d., English lead, £11 5s.@£11 6s. 3d.

Imports of lead in all forms into the United States, with re-exports of foreign lead, for the 10 months ending October 31, are reported by the Bureau of Statistics as below, the figures being in short tons of 2,000 lb.:

	1902.	1903.	Changes.
Lead, metallic	2,233	2,456	I. 223
Lead in ores and base bullion	85,100	85,867	I. 767
Total imports	87,333	88,323	I. 990
Re-exports	68,811	68,948	I. 137
Balance	18,522	19,375	I. 853

The balance given does not represent foreign lead entering into consumption here, but is chiefly metal in bond and in course of treatment. Of the lead imported this year, 78,040 tons, or 88.4 per cent, was from Mexico, and 7,247 tons, or 8.2 per cent, from Canada. In addition to the re-exports noted above, there were 52 tons of domestic lead exported, against 3,238 tons last year.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 14, that the price of silver during the week has been 14.50 reales per oz. Exchange has gone up, making it 33.55 pesetas to £1. Local quotation for pig lead has been 60.25 reales per quintal, which, on current exchange, is equal to £10 1s. 2d. per ton of 2,240 lb., f. o. b. Cartagena. Shipments for the week were 355,269 kg. lead and 1,450 kg. silver to Marseilles.

Spelter continues on its downward course, but a somewhat better consumptive demand is reported, and we understand that fair orders have been placed at the lower values established. The closing quotations are given as 4.45@4.50 St. Louis, 4.62½@4.67½ New York.

The foreign market is steady, good ordinaries being quoted at £20 5s., specials £20 10s.

The exports of spelter, or metallic zinc, from the United States, for the 10 months ending October 31, were 1,281 short tons, against 3,160 tons in the corresponding period of 1902, a decrease of 1,879 tons. Exports of zinc ore were 28,546 long tons, against 43,168 tons in 1902, a decrease of 14,622 tons.

A cargo of 2,000 tons zinc ore was shipped from New York to Rotterdam this week.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 14, that the market is firm and several cargoes are reported sold at good prices. There are still, however, large stocks of ore at the mines. Shipments for the week were 300 tons of blende to Swansea.

Antimony is without change. We quote: Cookson's at 6¾@7¼; Hallett's, 6¼@6⅜; U. S., 6@6¼; Italian, Japanese and French at 5⅝@5¾c.

Imports of antimony into the United States, for the 10 months ending October 31, were as follows, in pounds:

	1902.	1903.	Changes.
Metal and regulus	4,903,097	4,824,123	D. 78,974
Antimony ore	1,328,283	2,547,946	I. 1,219,663

This shows little change in metal, but a considerable increase in the ores imported.

Nickel.—The price is quoted by leading producers at 40c.@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Exports of nickel, nickel oxide and nickel matte from the United States, for the 10 months ending October 31, were 1,950,406 lb., against 2,572,835 lb. in the corresponding period in 1902; a decrease of 622,429 lb. this year. Most of the nickel is refined from Canadian matte. Imports of nickel ore and nickel matte this year were 5,013 tons.

Platinum.—Demand continues steady and the price remains at $19 per oz.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Imports of platinum into the United States, for the 10 months ending October 31, were 6,901 lb., against 6,135 lb. in the corresponding period in 1902; an increase of 766 lb. this year. The average value reported was $243.08 per lb. this year.

Quicksilver.—The New York price is $46.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations continue at $44@$45 per flask for domestic orders and about $41.50 for export. The London price is £8 5s. per flask, with the same quotation asked by second hands.

Imports of quicksilver into Great Britain, for the 10 months ending October 31, were 2,582,628 lb., against 2,441,546 lb. in the corresponding period in 1902. Re-exports of foreign quicksilver were 1,226,302 lb., against 1,309,772 lb. last year.

Exports of quicksilver from the United States, for the 10 months ending October 31, were 1,172,825 lb., against 812,387 lb. in the corresponding period in 1902; an increase of 360,438 lb. this year.

Cadmium.—Herr Paul Speier, writing from Breslau, Germany, reports that the quotation is very firm. The price for metallic cadmium, 99.5% is 675 marks per 100 kg. delivered in Breslau.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1, 98% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.

	Per lb
Ferro-Tungsten (37%)	38c.
Magnesium, pure (N. Y.)	60c.
Manganese	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on size of order.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1903	1902.	1903.	1902.	1903.	1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	27.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	26.77	26.60	4.243	4.075	5.686	5.49
October	25.92	26.07	4.375	4.075	5.510	5.38
November	25.42	25.68	4.218	4.075	5.398	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c. September 5.514c.; for October, 5.35c; for November, 4.86c.

Average Prices of Copper.

Month.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53,39
April	14.454	11.618	14.642	11.886	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.542	12.110	14.212	12.360	57.30	53.93
July	13 094	11.771	13.341	11.923	56.64	52,49
August	12.962	11.404	13.159	11.649	58.44	51.96
September	13.205	11.480	13.345	11.760	56.82	52.68
October	12.801	11.449	12.954	11.722	55 60	52.18
November	12.617	11.288	12.829	11.553	56.30	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars: prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903		1902.		1901.	
	London Pence.	N. Y., Cents.	London. Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	26.75	58.00	23.88	51.52	26.95	58.26
October	27.89	60.36	23.40	50.57	26.62	57.59
November	27.05	58.51	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
†Calumet & Arizona, Ariz.	Dec. 20	2.00	400,000	400,000
†Calumet & Hecla Copper.	Dec. 22	10.00	1,000,000	83,350,000
*Central Lead, Mo.	Dec. 15	.50	5,000	385,000
*Clinton, Colo.	Dec. 10	.30	3,000	60,000
*Daly-West, Utah	Dec. 15	.65	117,000	3,591,000
Granby Con., B. C.	Dec. 16	.10	133,630	133,630
†National Lead, pf.	Dec. 15	1.75	260.820	13,972,168
*Silver King, Utah	Dec. 10	.66	100,000	7,250,000
*St. Joseph Lead, Mo.	Dec. 15	.15	56,250	3,834,500
†Standard Oil	Dec. 15	12.00	11,640,000	206,715,000
Tonopah-Alpine, Nev.	Dec. 10	.07	70,000	70,000
†U. S. Steel, com.	Dec. 30	.50	2,541,513	53,350,978

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
American Quartz	Cal.	..	Dec. 23	.....	$0.25
Belcher	Nev.	75	Nov. 17	Dec. 8	.10
Caribou Oil	Cal.	..	Jan. 4	.....	.10
Champion	Cal.	..	Dec. 18	.....	.20
Chollar	Nev.	64	Dec. 10	Dec. 31	.10
Con. New York	Nev.	19	Dec. 1	Dec. 23	.10
Dexter-Tuscarora	Nev.	2	Dec. 21	Jan. 8	.02
Elephant	Utah	..	Dec. 1	Dec. 21	.01
Exchequer	Nev.	43	Dec. 14	Jan. 4	.05
La Palma	Mex.	..	Dec. 28	.....	.06
Little Bell Con.	Utah	1	Dec. 19	Jan. 5	.10
Maple Creek	Cal.	..	Dec. 22	.....	.10
Martha Washington	Utah	15	Nov. 24	Dec. 14	.01
Mexican	Nev.	76	Dec. 17	Jan. 7	.10
Middle Yuba	Cal.	..	Dec. 21	.....	.00½
New Almaden Quicksilver	Mex.	..	Dec. 28	.....	.00½
Overman	Nev.	..	Dec. 15	Jan. 5	.10
Park City Superior	Utah	..	Dec. 7	Dec. 24	.00¼
Posey Con	Cal.	..	Dec. 11	.....	.05
Potosi	Nev.	68	Dec. 8	Dec. 29	.10
Red Slide	Cal	..	Dec. 26	.....	.05
Savage	Nev.	111	Dec. 8	Dec. 29	.10
Sheep Ranch	Cal.	..	Dec. 7	.....	.75
Shenandoah Con.	Cal.	..	Dec. 14	.....	.02
Sierra Nevada	Nev.	131	Dec. 8	Dec. 28	.10
Silver Queen	Utah	1	Nov. 25	Dec. 15	.00¼
Tonopah & Salt Lake	Nev.	2	Nov. 28	Dec. 18	.10

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Nov. 25 H.	Nov. 25 L.	Nov. 27* H.	Nov. 27* L.	Nov. 27 H.	Nov. 27 L.	Nov. 28 H.	Nov. 28 L.	Nov. 30 H.	Nov. 30 L.	Dec. 1. H.	Dec. 1. L.	Sales.
Acacia Colo., g..	1	1,500,000											.06	.05	1,000
Amalgamated Mont c.	100	1,538,879	38⅜	37⅜			38⅜	38⅜	38⅛	37⅞	38⅝	37¾	39	38	63,793
Anaconda Mont., c. .	25	1,200,000	70	64			70½				68⅛		68		5,200
Anaconda, Colo.	2	1,000,000									11				500
Andes, Nev.	1	100,000					14								300
Belcher, Nev., s.	3	104,000													
Best & Belcher, Nev.,s	25	200,000													
Brunswick,Con.Cal., g	5	100,000													
Bullion, Nev., s.	1	100,000													
Caledonia, Nev., s	1	100,000													
Chollar, Nev., s., g.	2½	112,000					18						.25		200
Confidence, Nev.	3	24,950													
Con.Cal.&Va.,Nev.,g.s	2½	216,000							.92	.91	1.15		1.20	1.15	750
Con. Imperial, Colo.	1	500,000					.00				.04		.05		2,500
Daly, Utah, g. s. l.	20	150,000													50
Elkton, Colo., g.	1	1,250,000							.40				.41		1,000
El Paso, Colo., g.	1	650,000					.50								1,000
Gold Dollar, Colo.	1	500,000											.03		1,000
Gould & Curry, Nev.	1	108,900											39	38	300
Greene Con., Mex., c.	10	720,000	13½	12⅛			13	12⅝	13⅛	13	12⅞	11⅝	11¾	10⅞	14,514
Hale & Norcross, Nev.	100	112,000											55		300
Homestake, S. D., g.	100	218,400													
Iron Silver, Colo.	20	400,000													
Isabella, Colo., g.	20	500,000									.09				500
Little Chief, Colo.	50	200,000									.08				300
Mexican, Nev., s.	3	100,800					63	62							300
Mollie Gibson, Colo., g	5	1,000,000							.06½						400
Moon Anchor, Colo., g	5	400,000													
Moulton, Mont.	25	50,000													
Occidental, Nev., s.	3	100,000													
Old Gold, Colo.	1	1,000,000									.08				500
Ontario, Utah	100	150,000											1.90		500
Ophir, Nev., s.	3	100,800					1.45		1.65		1.90				
Overman, Nev.	2	115,200													500
Pharmacist, Colo.	1	1,500,000							.02						
Phœnix, Ariz.	1												1.00		400
Portland, Colo., g.	1	3,000,000					.95		1.15		28	27			1,400
Potosi, Nev. s.	1	112,000					.18		.18		.09				
Quicksilver Pf.	100	43,000									.42				400
Sierra Nevada, Nev.	3	100,000					30				.42				300
Silver Hill, Nev.	1	100,000									.65				150
Small Hopes, Colo.	20	250,000													
Standard, Cal.g.	10	178,304													
Syndicate, Cal.	1	100,000													
Tenn., Tenn., c.	25	175,000	28¾				28⅛				27½		28⅛		470
Union Con., Nev., g. s	1	100,000													500
Union Copper, N. C.	25	750,000	⅝				⅛	⅛	⅛		⅛		⅛		5,400
United, Mont., com., c	100	300,000							10						100
White Knob, Idaho, c.	10	200,000	9				9⅛	8¾	9		9⅜	9¼			1,900
Yellow Jacket, Nev., s	3	120,000													

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 185,413 shares. † Ex-dividend. *Per Cent. *Holiday.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Nov. 30. H.	Nov. 30. L.	Dec. 1. H.	Dec. 1. L.	Name of Company.	Nov. 30. H.	Nov. 30. L.	Dec. 1. H.	Dec. 1. L.
Acacia	.06	.05	.06	.05	Jack Pot	.05	.03	.05	.03
Am. Con.	.01⅝	.01¼	.01⅝	.01⅛	Keystone	.03	.02⅛	.03	.02⅛
Anaconda	.11	.09	.10½	.09¾	Last Dollar	.45	.40	.48	.35
Colo. City & Manitou	.01¾	.01	.01¾	.01	Lexington	.03½	.03¼	.03⅝	.03⅜
Cripple Creek Con	.03	.02½	.03	.02⅝	Little Puck	.02½	.01	.02½	.01
C. K. & N.	.18⅛	.16¼	.18	.17	Mollie Gibson	.07	.05	.06¾	.05¼
Doctor-Jack Pot	.04¾	.04½	.05¾	.04⅜	Moon Anchor	.11	.09	.11	.07
Elkton Con	.45	.43	.46	.43½	New Haven	.02¾	.02	.02½	.02⅛
El Paso	.49	.48½	.49	.48½	Old Gold	.10	.09½	.09¾	.09¾
Gold Dollar Con.	.03	.02¾	.02⅝	.02¾	Pharmacist	.03	.02¼	.02⅝	.02⅜
Golden Cycle	.61	.58	.61	.58	Pinnacle	.03	.01	.03	.01
Golden Fleece	.06	.04	.06	.04	Portland	1.10	1.00	1.10	1.00
Gold Sovereign	.03	.02¾	.03	.02¾	Vindicator	.80	.45	.85	.40
Isabella	.07½	.07	.07½	.07¼	Work	.04	.03½	.04	.03½

COLORADO SPRINGS, COLO.*

† Name of Company.	Par Val	Shares Listed.	Nov. 21 H.	Nov. 21 L.	Nov. 23 H.	Nov. 23 L.	Nov. 24 H.	Nov. 24 L.	Nov. 25 H.	Nov. 25 L.	Nov. 26* H.	Nov. 26* L.	Nov. 27 H.	Nov. 27 L.	Sales
Acacia	$1	1,500,000	.06	.05	.06	.05	.03	.05	.03	.05			.06½	.05	
American Con	1	2,000,000	.02		.02		.02	.01¼					.02		
Anaconda	5	1,000,000	.11½	.09¼	.01¼	.03½	.11¾		.11	.08			.11	.08	1,000
Colo. City & Manitou	1	1,000,000	.01¾		.01¾		.02		.02				.01½		
C. K. & N.	1	1,250,000	.20	.18	.19¾	.18	.18½	.18	.18¼	.17¼			.18	.17½	3,000
Cripple Creek Con	1	2,000,000	.02¼	.02⅛	.02¾	.02½	.03	.02½	.03	.02½			.02⅝		
Des Moines	1	750,000	.02	.01	.02	.01	.02½	.01	.02	.01½			.02	.01⅜	10,000
Doctor Jack Pot	1	2,000,000	.05¾	.04	.05½		.05⅝	.04½	.05¾	.04½			.06¾	.04½	
Elkton Con	1	1,250,000	.41¾	.40¾	.42	.40¾	.43	.41	.43	.41⅝			.43½	.43⅛	2,387
El Paso	1	900,000	.50		.50	.49½	.60		.50	.48½			.48	.48⅜	12,400
Findley	1	1,250,000													
Gold Dollar Con	1	500,000	.02¾	.02½	.02¾	.02⅝	.03	.02¾	.03				.03	.02½	2,000
Gold Sovereign	1	1,000,000	.03	.02¾	.03	.02½	.03	.02¾	.03	.02⅞			.03	.02⅞	
Golden Cycle	1	2,000,000	.63		.63	.58	.63	.58	.63	.58			.63	.58	
Golden Fleece	1	600,000	.06		.06		.06		.06				.06		
Gould	1	1,250,000	.003		.006		.005		.005	.001			.005	.001	
Hart	1	1,000,000	.04		.04		.03½		.03				.03½		
Isabella	1	3,000,000	.07¾	.05¼	.01½	.06	.07⅝	.07¾	.07½	.07⅜			.07½	.07	24,900
Jack Pot	1	1,250,000	.06		.06		.01		.07				.05¼		
Keystone	1	1,500,000	.01½		.02½	.02	.02½	.02	.02¼	.02			.02		
Last Dollar	1	1,500,000	.49		.49		.49		.49				.49		
Lexington	1	1,500,000	.04¼	.03¼	.04	.03½	.04	.03½	.03⅝	.03½			.03⅝	.03⅜	8,500
Little Puck	1	2,000,000	.02		.02		.02		.02				.02¼		
Mollie Gibson	5	1,000,000	.05		.05		.05		.05	.05¼			.08	.05	
Moon-Anchor	5	4,000,000	.11	.03½	.11	.09¾	.11	.10	.11	.09½			.11	.09½	
New Haven	1	1,500,000	.02		.02		.02		.02				.02		
Old Gold	1	1,800,000	.03¾	.03¼	.03½	.03¾	.03⅝	.03⅝	.03⅝	.03⅜			.03¾	.03⅜	14,000
Pharmacist, Con	1	1,500,000	.02⅜	.02¼	.02½	.02¾	.02¼		.02¼	.02⅜			.03	.02¼	
Pinnacle	1	2,000,000	.03		.03		.03		.03				.03		500
Portland	1	3,000,000	1.13	1.00	1.10	1.01	1.10	1.00	1.10	1.00			1.10	.92	500
Vindicator Con	1	1,500,000	.85		.85		.85		.85	.60			.75	.50	
Work	1	1,500,000	.03½	.03¼	.01¾		.04½	.03½	.04	.03¼			.04¼	.03½	

Colo. Springs Mining Stock Exchange. †All gold mines in Colorado. Total sales. 34,567 shares. *Holiday.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	Nov.-Dec. 30.	Nov.-Dec. 1.	Name of Company.	Shares Issued.	Nov.-Dec. 30.	Nov.-Dec. 1.
Belcher	104,000	.29	.38	Justice	105,000	.12	.14
Best & Belcher	100,800	1.50	2.20	Mexican	100,800	1.05	1.25
Caledonia	100,000	.89	1.10	Occidental Con.	100,000	.38	.44
Challenge Con.	50,000	.28	.32	Ophir	100,800	2.25	2.20
Chollar	112,000	.14	.17	Overman	115,200	.16	.22
Confidence	24,960	.84	.97	Potosi	112,000	.13	.17
Con. California & Virginia	216,000	1.30	1.30	Savage	112,000	.25	.35
Con. Imperial	500,000	.03	.04	Sierra Nevada	100,000	.48	.58
Crown Point	100,000	.21	.22	Union Con.	100,000	.62	.71
Gould & Curry	108,000	.32	.38	Utah Con.	100,000	.18	.19
Hale & Norcross	112,000	.51	.55	Yellow Jacket	120,000	.35	.35

COAL, IRON AND INDUSTRIAL STOCKS.

Name of Company.	Par val.	Shares Issued.	Nov. 25 H.	Nov. 25 L.	Nov. 26* H.	Nov. 26* L.	Nov. 27 H.	Nov. 27 L.	Nov. 28 H.	Nov. 28 L.	Nov. 30 H.	Nov. 30 L.	Dec. 1 H.	Dec. 1 L.	Sales
Allis-Chalmers	$100	200,000													
Allis-Cham's, pf	100	162,500										60¼			20
Am. Agr. Chem	100	172,156													
Am. Agr. Chem. pf.	100	181,350													
Am. Sm. & Ref.	100	500,000	43¾	42⅛			44½	44	44	43⅝	44¼	44	44½	44	12,180
Am.Sm. & Ref.,pf	100	500,000	87¼	85			88½	88¼	87½	87¼			88	87¾	3,900
Am. Steel Fdy	100	200,000													
Am. S. & Fdy., pf	100	200,000												39½	10
Col. Fuel & I. Colo.	100	239,310	25⅝	24¾			25½	25			25⅝	24	25½	24½	4,510
Col. & H. C. & I., Colo.	100	69,244	10¼						10¾				11		415
Crucible Steel	100	250,000	4	3⅞			4		3	3⅞			3⅞		300
Crucible Steel,pf.	100	250,000	30¼	29⅞			30				29⅞				192
General Chemical	100	74,100													
Ceneral Chemical, pf.	100	100,000													
Mong. R. Coal, Pa.	50	200,000	26	25½											60
Mong. R. Coal, pf, Pa.	50	97,300													
National Lead	100	149,054	14¾				14½		14¾		14¾		14½		1,160
National Lead, pf	100	149,040	80												15
Phila. Nat. Gas	100	308,542	35												2
Phila. Nat. Gas, pf.	100	212,873	42												6
Pittsburg Coal, Pa.	100	300,307	18½												70
Pittsburg Coal,pf.	100	297,012	61¾	60¼			61½	61	61¾	61	61	60⅛	60½		1,421
Republic I. & S.	100	273,560	6	5⅞			6	5⅝					6¼	6	1,310
Republic I. & S., pf.	100	204,169	39⅞	38⅝			40	38¾	41	38½	41	39¼	40	38	63,700
Sloss-Shef S. & I., Ala.	100	75,000	23								24				200
Sloss-Shef S.&I.pf,Ala	100	65,085							68						100
Standard Oil	100	970,000	650				649	648	648	645			645		27
Tenn. C.I. & R.R.	100	225,000	27½	26¾			28		28		28½	27¼	29	28½	4,300
U.S. Red. & Ref.	100	59,188													
U. S. Red & Ref., pf.	100	39,458													
‡U.S.Steel Corp.	100	5,084,952	11⅛	10⅞			11⅛	10⅞	11	10⅞	11	10⅝	11⅛	11	24,275
U. S. Steel Corp. pf.	100	5,103,141	52	50⅜			52⅛	51¼	52	51½	52¼	51¼	52½	51⅜	97,528
Va.-Car Chem.	100	279,844	18⅞	18½					19½		20⅜	20	20⅜	20	1,375
Va.-Car Chem.,pf.	100	120,000					89								100
Va. I., Coal & Coke	100	86,416	18												

†Ex-dividend Total sales, 217,202 shares. *Holiday.

BOSTON, MASS.

Name of Company.	Par val	Shares listed	Nov. 25 H.	Nov. 25 L.	Nov. 26* H.	Nov. 26* L.	Nov. 27 H.	Nov. 27 L.	Nov. 28 H.	Nov. 28 L.	Nov. 30 H.	Nov. 30 L.	Dec. 1 H.	Dec. 1 L.	Sales.
Adventure Con., c.	$25	100,000							3¾	3½	3½		3½	3¼	150
Allouez, c.	25	99,511							4⅞	4	4⅛				175
Amalgamated, c.	100	1,538,879	38⅜	37½			38⅛	38¼	38¼	38	38¾	37½	39	38⅛	8,238
Am. Gold Dredging	5	90,000													
Am. Zinc, Lead & Sm.	25	60,000					11	10½					10½	10¼	350
Anaconda, c. s.	25	1,200,000									17¾				10
Arcadian, c.	25	150,000	1												25
Arnold, c.	25	60,000													
Atlantic, c.	25	100,000													
Bingham Con. g. s.	50	150,000	21⅜				21½	21	21⅜	21	21½		21	20	1,445
Bonanza Dev. g.	10	300,000	.45												200
Breece, s. l.	25	100,000													
British Columbia, c.	5	256,800													
Calumet & Hecla, c.	25	100,000	†430				430		430		430		420	425	20
Centennial, c.	25	90,000	14½				14½						14½		405
Central Oil	25	60,050													
Con. Mercur, g.	5	1,000,000	.85								.80				110
Copper Range Con.	100	379,848	44	40½			44½	43¼	44	42⅞	42⅞	42	43½	42	30,500
†Daly West, g. s. l.	20	180,000	35¼	34¾			35		35¼	35	35⅜	35	35½	34½	850
Dominion Coal	100	150,000	72	71			72				71½	70¾			500
Dominion Coal, pf.	100	30,000											110¼		10
Dominion I. & S.	100	100,000					9	8½			8¼	8	8½		987
Elm River, c.	12	100,000											2 1/16		10
Franklin, c.	25	100,000													
Granby Con. g. s. c.	10	1,336,303	4¼				4¼	4⅛	4¼		4⅛	4	4¼	.†	2,679
Guanajuato Con. g.	5	385,000													
Isle Royal Con., c.	25	385,000	6				6¾	6¼	6⅝	6⅛	6⅜	6⅜	6⅝	6⅜	3,557
Mass Con., c.	25	100,000					4				4½				10
Mayflower, c.	25	100,000													
Michigan, c.	25	100,000									6¾				100
Mohawk, c.	25	100,000	31	35			35		35		35¼	35	35¾	35¼	200
Mont. Coal & Coke	25	200,000	3												100
Mont'l & Boston, c.	5	570,000	62½								.55		.60		500
New Odria, q.	5	100,000	9½												100
Nova Scotia St. & C.	100	37,623													
Nova Scotia St.&C., pf.	100	10,300													
Old Colony, c.	25	100,000	1¼				1⅞				1¾				225
Old Dominion, c.	25	150,000	8	7¾			9⅜		9		8½	8			100
Osceola, c.	25	96,150					57½	57	56⅝	56⅝	56¾	56			375
Parrot, s. c.	10	229,850									18		18		114
Phœnix Con, c.	25	100,000	3¾												100
Quincy, c.	25	100,000									82		80		97
Rhode Island, c.	25	100,000	1												100
Santa Fe, g. c.	10	250,000	1½				1⅝				1¾		1½		200
Shannon, c.	10	298,913	8⅛	8¼			8¼	8¼	8¼		8		8	7⅞	985
Tamarack, c.	25	60,000	90	86			87				87	85	85	81	950
Tecumseh, c.	25	80,000													
Tennessee, c.	25	175,000													
Trinity, c.	25	100,000	5¼	5½			5½	5	5		5	4¾	5	4¾	1,575
United c.	100	450,000													
United States, g.	10	300,000	18⅛	17½			18⅜	17¾	18	17½	18	17½			1,592
U. S. Coal & Oil.	25	240,000	8¾	7¾			8¾	8¼	9	8¼			8¾		2,315
Utah Con., g. c.	5	231,096					27¼		27¼	27⅛	27¼	27	27	26⅝	1,316
Victoria, c.	25	100,000	2⅛				2⅜				2⅜		2⅜	2⅛	335
Winona, c.	25	100,000	7¼						7¾		7¼		7⅛		180
Wolverine, c.	25	60,000	67	65							67		67		225
Wyandot, c.	25	100,000							87½				87½		110

†Ex-dividend. ‡Assessment Paid. Total sales, 62,280 shares.
c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. *Holiday.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Nov. 20 H.	Nov. 20 L.	Nov. 21 H.	Nov. 21 L.	Nov. 23 H.	Nov. 23 L.	Nov. 24 H.	Nov. 24 L.	Nov. 25 H.	Nov. 25 L.	Nov. 26* H.	Nov. 26* L.	Sales
Bru'w'k Con. M.G. Co.	Cal..	500,000			.03						03				2,000
Central Eureka g.	Cal..	400,000									84				100
Draper Gold Mg. Co.	Cal..	500,000	.14						.14		.14				11,100
Dutch M. & M. Co.	Cal..	125,000													
Esperanza g.	Nev..	1,000,000	.01		01				.01			.01			14,000
Golconda Con. g.	Ore..	3,000,000													
Hannapah g.	Nev..	1,000,000			10										2,500
MacNamara g.	Nev..	500,000							.10						50
Montana-Tonopah, g.	Nev..	1,000,000	1.17½	1.10	10 2½	107½	112½	1.10	1.10	1.05	1.10				6,150
N. Y. Tonopah, g.	Nev..	1,000,000							.05						100
Paymaster	Nev..	750,000													
Pine Grove, g.	Nev..	1,000,000													
Rescue, g.	Nev..	1,000,000									05				5,000
South Eureka	Cal..	300,000													
Tonopah-Belmont, g.	Nev..	2,000,000													900
Tonopah & Cal., g	Nev..	2,000,000					20		20		20				
Tonapah & Gt. West'n	Nev..	750,000													600
Ton. Midway Mg. Co.	Cal..	1,000,000	34		35										400
Tonopah, g	Nev..	1,000,000			6.50						7.00				3,800
Tonopah North Star, g	Nev..	750,000	32		35		36		35	34	38	36			
Tonopah & Salt Lake.	Nev..	300,000													
Wild Goose	Al'ka	1,000,000													

‡San Francisco and Tonopah Mining Exchange. †Ex-Dividend g—Gold. Total sales, 36,700 shares. *Holiday.

STOCK QUOTATIONS

MEXICO.* Nov. 20

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles..	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos....	2,400	5.00	56	65
Cinco Senores y An., aviadoras.....	2,000	15.00	75	80
Cinco Senores y An., aviada	400	10.00	70	80
Providencia, San Juan de la Luz.....	6,000	2.00	88	90
Queensland y Australia	300	.....	60	75
Guerrero:				
Delfina, 1st serie.....	2,500	.....	35	40
Delfina, 2nd serie....	2,500	.....	30	40
Garduno y Anexas...	7,200	.....	40	50
Hidalgo:				
Amistad y Condordia	9,600	8.87	83	84
Carmen, aviada.....	1,100	.....	120	150
Guadalupe Fresnillo Mill	1,000	.....	160	250
Guadalupe Fresnillo Mine.....	1,400	.....	70	80
La Blanca, aviadora.	1,536	.....	.....	.....
La Blanca, aviada....	768	.....	.....	.....
La Reina y An., aviadora.....	5,600	.....	19	21
Luz de Maravillas, aviadas.....	1,100	.....	.....	20
Maravillas y An., aviador.....	1,680	.....	120	140
Maravillas el Lobo ..	1,000	.....	130	180
Palma y An., aviador.....	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada.....	12,800	.....	7	8
Santa Anay An., aviadora.....	1,800	.....	35	40
Santa Anay An., aviada.....	600	.....	25	30
Sta. Gertrudis y An., aviadas.....	9,600	.....	15	17
Sta. Gertrudis y An., aviadora.....	28,800	1.00	81½	83
Santo Tomas Apostol aviadoras.....	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	18	20
San Felipe de Jesus, aviada	1,200	.....	6	10
San Rafael y An., Trompillo.....	1,200	12.00	1,630	1,650
San Rafael y An., aviada.....	1,200	4.00	620	640
Soledad, aviada.....	960	5.00	620	650
Sorpresa, aviada. ...	960	5.00	290	300
.....	.....	.....	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran.....	2,400	.....	2	60
Aldebarren.....	2,000	.....	60	65
Buen Despacho.....	3,000	.....	60	63
Dos Estrellas.....	3,000	30.00	1,800	1,810
La Esperanza (El Oro.).....	3,000	10.00	1,500	1,500
La Reformia, aviadores.....	2,000	.....	35	40
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, liberadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	90	.....
Michoacan:				
Luz de Borda, aviadora.....	3,000	.....	120	130
Luz de Borda, aviado.....	1,000	.....	45	50
Nuevo Leon:				
La Fraternal.....	1,000	.....	575	625
Norias de Bajan.....	1,000	.....	800	850
Santiago y An., Tlal..	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.....	3,000	.....	60	70
El Barreno, aviadora.	2,000	2.00	54	58
Sta. Maria de la Paz..	2,400	20.00	805	810
San Diegoy Annexas.	2,400	4.00	8	10
Zacatecas:				
Asturiana y An.....	2,500	.....	60	65
Candelaria y Pinos..	2,500	10.00	140	150
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	6	8
Lourdes.....	2,500	.....	40	60
Luz de Minillas, pagadoras.....	2,000	.....	15	30
Nueva Quebradilla, aviadoras.....	2,400	.....	100	110
Nueva Quebradilla, aviadas.....	600	.....	70	80
San Carlos y Annexas	2,500	20.00	140	150
Sta. Maria de Gaud..	2,500	10.00	55	60
Miscellaneous:				
Bartolome de Medina	2,000	1.50	76	80
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.).....	3,750	.....	.....	.....
La Reina (Chihuahua.).....	192	.....	.....	.....
Naica (Chihuahua.)..	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora.....	1,800	10.00	1,000	1,050
Natividad (Oaxaca) aviadas.....	600	4.00	.....	.....
San Francisco Hac...	6,000	1.00	70	73
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	3,000	5.00	210	250

*Values are in Mexican currency.

TORONTO, ONT. Nov. 28

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail, g.....	$1	.04	.02	.....
Cariboo-McKinney, g.	1	.11	.05	.....
Cariboo Hydraulic, g.	1	.75	.....	.....
Center Star, g. s.....	1	.23	.21	10,000
Crows Nest, Coal & C.	100	2.60	2.00	.....
Dominion Coal, com..	100	72½	.71	.....
Dominion S. & I.....	100	.....	.....	.....
Fairview, g. s.....	1	.05	.03	.....
Giant, g. s.....	1	.02½	.03	.....
Deer Trail, g. s.....	1	.02½	.01	.....
Iron Mask, g. s.....	1	.06	.....	.....
Morrison, g. s.....	1	.04	.02	.....
.....	.....	.....	.....	.....

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter.....	$10	4.60	4.00	.....
Mountain Lion, g.....	1	.28	.20	.....
North Star, g. s.....	1	.12	.08	.....
Nova Scotia Steel, com	100	.....	.....	.....
Payne, s. l.....	1	.15	.12	.....
Rambler Cariboo, g..	1	.40	.28	.....
Republic, g.....	1	.02	.....	.....
St. Eugene, g. s.....	1	.46	.35	.....
Virtue, g. s.....	1	.07	.05	.....
War Eagle Con., g. s..	1	.12	.08½	.....
Sullivan, g. s.....	1	.06	.04	.....
Winnipeg, g. s.....	1	.05	.04	.....
Wonderful, g. s	1	.04	.....	.....

g—Gold. l—Lead. s—Silver. Total Sales, 10,000

SALT LAKE CITY.* Nov. 28

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax.....	10	300,000	.05	.03⅝	18,500
Butler Liberal.....		500,000	.13	.11⅝	2,000
California.....		.....	.05	.05	500
Carisa	1	300,000	.09½	.09½	2,000
Century.....		.....	.64	.64	200
Con. Mercur...	5	1,000,000	.85	.80	4,300
Daly-Judge	20	300,000	8.75	7.40	1,270
Daly West.....	20	180,000	35.70	34.70	1,107
Grand Central.	1	250,000	3.70	3.70	100
Ingot.....	½	500,000	.01½	.01½	500
Joe Bowers.....		.....	.....	.....	.....
Keystone.....	1	500,000	.....	.....	.....
La Reine.....	1	800,000	.....	.....	.....
Little Chief....	10	490,000	.01	.03	2,000
L. Mammoth..	1	150,000	.43	.36	5,700
Manhattan.....	10	1,000,000	.00½	.00⅛	1,000

Name of Company	Par Val	Shares	High	Low	Sales.
May Day.....	¼	400,000	.07⅛	.03¾	15,200
M. Washington	½	300,000	.01¾	.00⅞	18,000
Naildriver.....	2	300,000	.70	.65	150
N. Y. Bonanza.	1	300,000	.15	.15	500
Northern Light	5	400,000	.....	.....	.....
Richm'd Ancda		.....	.....	.....	.....
Sacramento...	5	1,000,000	.24½	.23	7,300
Silver Shield...	20	800,000	.....	.....	.....
So. Swansea....	1	300,000	.10	.09½	1,800
Star Con.....	1	400,000	.25	.22	7,000
Tetro.....	1	300,000	.28½	.27⅜	8,200
Uncle Sam Con.	1	500,000	.23½	.23½	3,200
Valeo.....		.....	.....	.....	.....
Victor Con.....	1	500,000	.....	.....	.....
Wabash	1	500,000	.....	.....	.....
Yankee Cons...	1	500,000	.41	.35½	4,200

*By our Special Correspondent. All mines are in Utah. Total sales, 104,627 shares.

PHILADELPHIA, PA *

Name and Location of Co.	Par val.	Nov. 25 H.	Nov. 25 L.	Nov. 26.* H.	Nov. 26.* L.	Nov. 27. H.	Nov. 27. L.	Nov. 28. H.	Nov. 28. L.	Nov. 30. H.	Nov. 30. L.	Dec. 1. H.	Dec. 1. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement...	10	.....	.....	.....	.....	6¾	.....	6¾	.....	6⅞	.....	6⅞	6¾	60
CambriaIron, Pa	50	46	.....	.....	.....	.....	.....	.....	.....	.....	.....	46½	.....	68
Cambria St , Pa	50	17⅝	.....	.....	.....	17⅝	17⅜	17½	.....	17⅞	17⅝	17⅞	.....	939
Penn. Steel, pfd	100	73	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I & S., Pa	5	.....	.....	.....	.....	.....	.....	.....	.....	¾	.....	⅝	⅝	850
United Gas Imp.	50	78⅛	78½	.....	.....	78	78¼	78¾	78⅛	78⅞	78½	80⅜	78⅞	1,656
Warwick I. & S.	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Diamond Steel.	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lehigh Navig'n	50	.....	.....	.....	.....	65	.....	.....	.....	.....	.....	.....	.....	3
Philadelphia....	50	36	35¾	.....	.....	.....	.....	36	35⅞	36¼	36	36⅜	36¼	1,031
U. S. Steel.....	100	11¼	11	.....	.....	11¼	10⅞	11¼	.....	11	10⅞	11	.....	2,460
U. S. Steel. pf..	100	51⅞	50⅞	.....	.....	51⅞	51⅜	.....	.....	52⅛	51¾	52⅛	51⅝	3,410

*Holiday. Total sales 10,512.

LONDON. Nov. 20

Name and Country of Company.	Shares Issued.	Par value. £.	s.	d.	Latest dividend. Amt. s.	d.	Date.	Quotations. Buyers. £	s.	d.	Sellers. £	s.	d.
American:													
Alaska-Treadwell, Alaska, g.....	200,000	5	0	0	1	6	Nov., 1903	3	17	6	4	2	6
*Anaconda, Montana, c. s.	1,200,000	5	0	0	2	0	Nov., 1903	3	6	3	3	8	9
*Camp Bird, Colorado, g.....	820,000	1	0	0		9	Nov., 1903	1	6	3	1	7	6
Copiapo, Chile, c.....	112,500	2	0	0	6	10	May, 1903	1	5	0	1	10	0
§De Lamar, Idaho, g. s.....	80,000	1	0	0	2	0	Oct., 1903		11	3		13	9
El Oro, Mexico, g. s.....	1,080,000	1	0	0	1	6	July, 1903	1	6	3	1	8	9
Frontino & Bolivia, Colombia, g. s...	128,682	1	0	0	3	0	July, 1901		7	6		10	0
Le Roi, British Columbia, g. s.....	200,000	5	0	0	5	0	Nov., 1899		12	6		15	0
Le Roi No. 2, British Columbia, g.....	120,000	5	0	0	5	0	May, 1902		16	3	1	1	3
Montana, Montana, g. s.....	657,128	1	0	0		6	April 1899		1	0		1	6
Standard, Arizona, c.....	500,000		4	0		2½	Sept., 1903		3	6		4	6
Stratton's Independence, Colorado, g	1,000,007	1	0	0	1	0	Aug., 1903		5	0		5	6
St. John del Rey, Brazil, g.....	546,265	1	0	0		6	Dec., 1903		15	6		16	6
Tomboy, Colorado, g.....	300,000	1	0	0	1	0	June, 1902	1	5	0	1	10	0
Utah Consolidated, Utah, c. g.....	300,000	1	0	0	6	3	July, 1903	5	15	0	6	0	0
Ymir, British Columbia, g.....	200,000	1	0	0	1	0	Mar., 1902		5	0		7	6
European:													
Linares, Spain, l.....	15,000	3	0	0	1	0	Mar., 1903	2	10	0	3	10	0
Mason & Barry, Portugal, c.....	185,172	1	0	0	11	0	May, 1903	3	7	6	3	12	6
Rio Tinto, Spain, c.....	325,000	5	0	0	32	6	Nov., 1903	48	5	0	48	10	0
Rio Tinto, pref., Spain, c.....	325,000	5	0	0	2	6	Nov., 1903	6	0	0	6	5	0
Tharsis, Spain, c.....	625,000	2	0	0	6	0	May, 1903	4	7	6	4	12	6
West Australian:													
Associated, g.....	495,388	1	0	0	2	0	July, 1903	2	17	6	2	18	9
Cosmopolitan Proprietary, g.....	400,000	1	0	0	1	0	May, 1903		17	0		17	6
Golden Horse Shoe, g.....	300,000	5	0	0	6	0	Nov., 1903	9	3	9	9	6	3
Great Boulder Proprietary, g.....	1,750,000		2	0		9	Dec., 1903	1	9	3	1	9	9
Great Fingall Consolidated, g	250,000	1	0	0	8	0	Oct., 1902	9	0	0	9	2	6
Ivanhoe g.....	200,000	5	0	0	5	0	Oct., 1903	8	17	6	9	0	0
Kalgurli, g.....	120,000	1	0	0	2	6	Oct., 1903	4	17	6	5	0	0
Lake View Consols, g.....	250,000	1	0	0	rts.		Aug., 1902	1	12	6	1	15	0
Oroya-Brownhill, g.....	450,000	1	0	0	2	0	Sept., 1903	3	15	0	3	17	6
Miscellaneous:													
Brilliant Central, Queensland, g.....	100,000	1	0	0	..	9	Nov., 1903	3	2	6	3	7	6
Briseis, Tasmania, t.....	600,000	1	0	0	..	..	.....		3	9		4	3
Broken Hill Proprietary, N. S. W., s. l	960,000		8	0	1	0	Aug., 1903	1	8	6	1	9	6
Mt. Lyell, Tasmania, c.....	275,000	3	0	0	4	3	Sept., 1903	18	6			19	6
*Mt. Morgan, Queensland, g.....	1,000,000	1	0	0		3	Nov., 1903	2	12	6	2	17	6
Waihi, New Zealand, g.....	497,412	1	0	0	2	6	Dec., 1903	5	1	3	5	3	9
Indian:													
Champion Reef, g..	473,000		10	0	5	6	Aug.. 1903	7	17	6	8	0	0
*Mysore, g.....	566,043		10	0	4	0	Nov., 1903	6	6	3	6	8	9
Nundydroog, g.....	484,000		10	0	1	6	Nov., 1903	1	18	9	2	1	3
Ooregum, g	343,000		10	0	1	9	Aug., 1903	1	1	8	1	3	0
Ooregum, pref ..g.....	240,000		10	0	1	9	Aug., 1903	1	11	3	1	13	9
South African:													
Angelo, g.....	600,000	1	0	0	6	0	Aug., 1903	6	12	6	6	17	6
Bonanza, g.....	200,000	1	0	0	10	0	Aug., 1903	2	1	3	2	3	9
British South Africa..	4,436,019	1	0	0	rts.		May, 1889	2	5	0	2	6	3
Cape Copper, c.....	300,000	2	0	0	1	0	July, 1903	3	1	3	3	3	9
Cape Copper, pref., c.....	75,000	2	0	0	1	0	July, 1903	3	0	0	3	5	0
City & Suburban, g.....	340,000	4	0	0	4	0	Aug., 1903	6	7	6	6	10	0
Consolidated Gold-Fields.....	2,000,000	1	0	0	..	..	.....	5	6	3	5	8	9
*Crown Reef, g.....	120,000	1	0	0	20	0	Oct., 1903	16	15	0	17	0	0
De Beers Con., d.....	800,000	2	10	0	10	0	Aug., 1903	19	0	0	19	2	6
De Beers Con., deferred, d.....	1,000,000	2	10	0	15	0	Aug., 1903	20	5	0	20	7	6
East Rand Proprietary, g.....	930,000	1	0	0	5	0	Aug., 1903	7	3	9	7	6	3
Ferreira, g.....	90,000	1	0	0	15	0	Aug., 1903	19	10	0	20	0	0
Geldenhuis Estate, g.....	200,000	1	0	0	6	0	Aug., 1903	6	6	3	6	8	9
Geduld, g.....	400,000	1	0	0	rts.		Mar., 1902	6	6	3	6	8	9
Henry Nourse, g.....	125,000	1	0	0	10	0	Aug., 1903	8	10	0	8	15	0
Jubilee, g.....	50,000	1	0	0	5	0	July, 1903	5	0	0	5	5	0
Jumpers, g.....	100,000	1	0	0	5	0	Aug., 1899	3	2	6	3	7	6
Langlaagte Estate, g	470,000	1	0	0	3	0	Aug., 1903	3	13	9	3	16	3
May Consolidated, g.....	288,750	1	0	0	3	0	Aug., 1903	4	0	0	4	2	6
Meyer & Charlton, g	100,000	1	0	0	3	0	Aug., 1903	5	7	6	5	12	6
Modderfontein, g.....	290,000	1	0	0	rts.		Apr., 1902	8	15	0	8	17	6
Namaqua, c.....	94,331	2	0	0	2	0	June, 1903	3	5	0	3	10	0
New Jagersfontein, d	200,000	5	0	0	10	0	Nov., 1903	28	12	6	28	17	6
New Primrose, g.	325,000	1	0	0	2	0	Aug., 1903	3	13	9	9	16	3
Rand Mines, g.....	1,795,956		5	0	4	0	Aug., 1902	9	13	9	9	16	3
Robinson, g.....	750,000	5	0	0	5	6	Aug., 1903	10	0	0	10	5	0
Robinson Deep, g.....	950,000	1	0	0	2	0	Aug., 1903	5	8	9	5	11	3
Rose Deep, g.....	425,000	1	0	0	2	0	Aug., 1903	8	7	6	8	10	0
Salisbury, g.....	100,000	1	0	0	2	0	Mar , 1899	1	10	0	1	15	0
Sheba, g.....	1,075,000	1	0	0		6	July, 1599		13	9		16	3
Village Main Reef, g.....	400,000	1	0	0	4	0	June, 1903	7	17	6	8	2	6
Wemmer, g.....	80,000	1	0	0	10	0	July, 1903	10	5	0	10	10	0

c—Copper. d—Diamonds. g—Gold. l—Lead. s—Silver. t—Tin. *Ex-dividend. †Ex-rights.

LONDON (By Cable.)*

Name of Company.	Nov. 24. £.	s.	d.	Dec. 2. £.	s.	d.
Anaconda.....	3	5	0	3	12	6
British South Africa.....	2	10	0	2	8	9
Camp Bird.....	1	6	0	1	6	9
Con. Gold Fields.....	6	10	6	6	11	6
De Beers Con. def.....	20	6	3	20	15	0
East Rand.....	7	6	3	7	7	6
El Oro, Mex..	1	7	6	1	6	9

Name of Company.	Nov. 24. £.	s.	d.	Dec. 2. £.	s.	d.
Johannesburg Invest....	3	2	6	2	18	9
Modderfontein.....	8	18	9	9	5	0
Rand Mines.....	9	17	6	10	0	0
Rio Tinto	48	7	6	48	8	9
Simmer & Jack.....	1	12	6	1	13	9
Tomboy.....	1	11	3	1	10	7½
.....	.....	.....	.....	.....	.....	.....

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Nov. 12

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Alameda.....	California ...	Oil.....	1,000,000	1	9.50	5.50	5.50
Anzin	France	Coal	.....	.....	200.00	5,580.00	5,700.00
Boleo.....	Lower Cal....	Copper.....	12,000,000	500	62.50	1,630.00	1,680.00
Canadian-American	Canada.....	Coal.....	.....	20	.....	27.00	28.00
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	20.00	18.50
Courrieres	France	Coal	600,000	300	110.00	2,911.00	2,920.00
Fraser River.....	Brit. Col'mb..	Gold.....	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia.....	Silver.....	40,000,000	125	5.00	83.00	81.75
Laurium.....	Greece.....	Zinc, Lead....	16,300,000	500	25.00	354.00	364.00
Malfidano.....	Italy	Zinc	12,500,000	500	50.00	575.00	576.00
Metaux, Cie. Fran. de.....	France	Metal dealers.	25,000,000	500	22.50	507.00	501.00
Mokta-el-Hadid.....	Algeria	Iron	18,312,000	500	40.00	830.00	834.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	484.00	481.00
Sedalia & California.....	California.....	Oil.....	1,000,000	1	.....	5.00	5.00
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	685.00	675.00
Wyoming	California.....	Oil	.....	25	.....	310.00	310.00

ST. LOUIS, MO.* Nov. 21

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	300,000	$0.10	$0.25
Catherine Lead, Mo.	10	50,000	1.50	2.25
Central Coal & C....	100	51,250	53.00	55.50
Central C. & C., pf..	100	18,750	68.00	70.00
Central Lead, Mo...	100	10,000	110.00	120.00

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$10	50,000	$2.00	$2.50
Con. Coal, Ill.....	100	50,000	16.00	22.00
Doe Run Lead Co..	100	15,000	110.00	115.00
Granite Bimet. Mt..	10	100,000	.50	.60
St. Joe Lead, Mo,...	10	600,000	14.50	16.00

*By our Special Correspondent.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.—UNITED STATES.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid. 1903	Total to Date	Latest. Date.	Amt.
Acacia, g.	Colo.	$1,500,000	1,433,000	$1	$14,300	$57,500	Apr. 1903	$0.01
Adams, s. l. c.	Colo.	1,500,000	150,000	10	.....	738,500	Oct. 1902	.05
Aetna Con., q.	Cal.	500,000	100,000	5	.....	325,000	Apr. 1900	.15
Alaska-Mexican, g.	Alaska.	1,000,000	180,000	5	90,000	585,380	Oct. 1903	.20
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	450,000	5,275,000	Nov. 1903	.37½
Amalgamated, c.	Mont.	155,000,000	1,530,879	100	3,077,720	22,734,407	Nov. 1903	.50
Am. Sm. & Ref., pf.	U. S.	50,000,000	500,000	100	3,500,000	12,991,553	Oct. 1903	1.75
Anaconda, c	Mont.	30,000,000	1,200,000	25	1,200,000	23,250,000	Nov. 1903	.50
Annie Laurie, g.	Utah	5,000,000	50,000	200	200,000	200,000	Aug. 1903	.50
Arizona, c.	Ariz.	3,775,000	.....	...	1,003,128	4,448,596	Aug. 1903	.....
Atlantic, c.	Mich.	1,000,000	40,000	25	.....	940,000	Feb. 1901	2.00
Bald Butte, g. s.	Mont.	250,000	200,000	1	15,000	1,312,148	Jan. 1903	.06
Boston & Colo. Sm.	Colo.	750,000	15,000	50	.....	409,350	Oct. 1902	.75
Boston Gold-Copper Sm.	Colo.	1,000,000	1,000,000	1	.....	150,000	Nov. 1901	5.02½
Boston & Mont. Con., c. s. g.	Mont.	3,750,000	150,000	25	1,200,000	28,325,000	Oct. 1903	2.00
Breece, l. s.	Colo.	5,000,000	200,000	25	10,000	200,000	June 1903	.05
Bunker Hill & Sullivan	Idaho	3,000,000	300,000	10	60,000	1,436,000	Nov 1903	.10
Butte & Boston, c.	Mont.	2,000,000	200,000	10	.....	1,600,000	Nov. 1901	3.00
Butterfly-Terrible, g.	Colo.	1,500,000	1,250,000	1	.....	31,250	Oct. 1901	.00½
C. K. & N., g.	Colo.	1,500,000	1,431,900	1	71,595	85,914	Sept. 1903	.01
Calumet & Arizona, c.	Ariz.	2,500,000	200,000	10	400,000	400,000	Dec. 1903	2.00
Calumet & Hecla, c.	Mich.	2,500,000	100,000	25	13,500,000	83,350,000	Dec. 1903	10.00
Camp Bird, g.	Colo.	5,500,000	820,000	5	843,166	967,704	Nov. 1903	.18
Carisa, g. s. c.	Utah	500,000	500,000	1	.....	30,000	Nov 1903	.03
Centennial Eureka, g. s. l. c.	Utah	5,000,000	100,000	25	.....	2,667,700	Jan. 1902	.50
Center Creek, l. z.	Mo.	1,000,000	100,000	10	10,000	110,000	July 1903	.10
Central Eureka, g.	Cal.	4,000,000	398,525	10	87,648	111,398	Nov 1903	.02
Central, l.	Mo.	1,000,000	10,000	100	55,000	390,000	Nov 1903	.50
Century, g. s. l.	Utah	150,000	150,000	1	7,000	7,000	Dec. 1903	.01
Champion, c.	Mich.	2,500,000	100,000	28	100,000	100,000	May 1903	1.00
Chippewa Con., g. s. l.	Colo.	150,000	150,000	1	.....	2,500	Dec. 1902	.03
Clinton, g. s.	Colo.	100,000	1,000	100	30,000	60,000	Dec. 1903	.30
Con. Mercur, g.	Utah	5,000,000	1,000,000	5	150,000	1,030,000	May 1903	03½
Continental, z	Mo.	550,000	22,000	25	35,200	59,800	Oct. 1903	.40
Dalton & Lark, g. s. l.	Utah	2,500,000	2,500,000	1	.....	370,000	July 1901	.10
Daly West, g. s. l.	Utah	3,000,000	180,000	20	1,215,000	3,474,000	Nov 1903	.65
De Lamar, g. s.	Idaho	400,000	67,180	5	32,246	2,740,340	Oct. 1903	.48
Doctor-Jack Pot Con., g.	Colo.	3,000,000	2,900,000	1	.....	232,000	Aug. 1901	.01
Doe Run, l.	Mo.	1,500,000	15,000	100	90,000	627,072	Oct. 1902	1.50
Elkton Con., g.	Colo.	3,000,000	2,500,000	1	.....	1,401,461	Mar. 1902	.04
El Paso, g.	Colo	900,000	810,250	1	16,204	51,249	Nov 1903	.00½
Empire State-Idaho, l. s.	Idaho	6,000,000	505,542	10	227,494	1,738,604	Sept. 1903	.05
Free Coinage, g.	Colo.	1,000,000	10,000	100	.....	160,000	Dec. 1902	.20
Gemini, g. s. l.	Utah	500,000	5,000	100	100,000	950,000	June. 1903	10.00
Gold Coin of Victor, g.	Colo.	1,000,000	1,000,000	1	10,000	1,230,000	Jan. 1903	.01
Gold King,	Colo.	1,000,000	936,850	1	46,842	459,057	July 1903	.03
Golden Argus, g.	Cal.	800,000	8,000	100	.....	2,000	Dec. 1902	.25
Golden Cycle, g.	Colo.	2,000,000	1,500,000	1	292,500	348,750	Aug. 1903	.03
Golden Eagle, g.	Colo.	500,000	489,015	1	.....	98,916	Sept. 1901	.01
Good Hope, g. s.	Colo.	50,000	500	100	12,500	19,500	Jan. 1903	.25
Grand Central, g.	Utah	250,000	250,000	1	200,000	891,250	Nov 1903	.10
Gwin, g.	Cal.	1,000,000	100,000	10	.....	496,500	Dec. 1902	.15
Hecla, s. l.	Idaho	250,000	1,000,000	¼	20,000	120,000	June 1902	.02
Hecla Con., s. l.	Mont.	1,500,000	30,000	50	.....	2,930,550	Apr. 1902	.25
Homestake, g.	S. D.	21,800,000	218,400	100	600,900	12,317,750	Nov 1903	.25
Horn Silver, g. s. c. z. l.	Utah	10,400,000	400,000	25	.....	5,312,000	Dec. 1901	.10
Independence Con., g.	Colo.	2,500,000	2,500,000	1	.....	281,375	Apr. 1901	.04
Ingham Con., g.	Colo.	750,000	1,359,600	½	.....	33,981	Aug 1901	.00¼
International Nickel, pf.	U. S.	12,000,000	87,415	100	349,660	349,980	May 1903	10.00
Iowa, g. s. l.	Colo.	1,666,667	1,666,667	1	66,668	338,837	Oct. 1903	.01
Iron Silver.	Colo.	10,000,000	500,000	20	200,000	2,850,000	Oct. 1903	.10
Isabella, g.	Colo.	2,250,000	1,250,000	1	.....	742,500	Mar 1901	.01
Jamison, g.	Cal.	3,900,000	390,000	10	11,700	74,100	Jan. 1903	.03
Kendall, g.	Mont.	2,500,000	500,000	5	205,000	280,000	Nov 1903	.05
Kennedy, g.	Cal.	10,000,000	100,000	100	.....	1,801,001	June 1900	.05
La Fortuna, g.	Ariz.	250,000	250,000	1	.....	1,092,500	Oct. 1902	.05
Last Dollar, g.	Colo.	1,500,000	1,500,000	1	30,000	210,000	Mar 1903	.02
Liberty Bell, g.	Colo.	700,000	130,549	1	78,208	91,233	Oct. 1903	.15
Lightner, g.	Cal.	125,000	102,255	1	15,339	48,969	May. 1903	.10
Mammoth, g. s. c.	Utah	10,000,000	400,000	25	.....	1,860,000	July 1901	.05
Mary McKinney, g.	Colo.	1,000,000	1,000,000	1	90,000	560,000	July. 1903	.03
May Day, g.	Utah	100,000	400,000	¼	.....	30,000	Mar 1902	.01
Midget, g.	Colo.	1,000,000	1,000,000	1	.....	195,000	Apr. 1902	.15
Mine La Mott, l.	Mo.	3,300,000	300,000	10	240,000	240,000	Oct. 1903	.20
Mines Co. of America,	U. S.	2,000,000	2,000,000	1	405,000	405,000	Oct. 1903	.09
Modoc, g. s.	Colo.	500,000	500,000	1	5,000	255,000	Jan. 1903	.01
Mont. Ore Purchasing, g. s. l.	Mont.	2,500,000	81,000	25	648,000	3,294,000	Sept. 1903	4.00
Mountain, c.	Cal.	6,250,000	250,000	25	142,500	3,776,250	May. 1903	.57
Napa Con., q.	Cal.	700,000	100,000	7	.....	1,180,000	Oct. 1902	.10
National Lead, com.	U. S.	15,000,000	159,054	100	.....	1,341,486	Mar 1900	1.00
National Lead, pf.	U. S.	15,000,000	149,040	100	1,043,280	13,972,168	Dec. 1903	1.75
New Idra, q.	Cal.	500,000	100,000	5	120,000	520,000	Oct. 1903	.30
New Jersey, z.	U. S.	10,000,000	100,000	100	1,200,000	6,000,000	Nov 1903	3.00
New Leadville Home, g.	Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. 1902	.00½
Nugget, g.	Colo.	1,000,000	991,000	1	.....	84,730	July. 1901	.01
Ontario, s. l.	Utah	15,000,000	150,000	100	.....	14,917,000	Dec. 1902	.02
Osceola, c.	Mich.	2,500,000	596,150	25	.....	4,247,300	Dec. 1901	3.00
Parrot, c.	Mont.	2,300,000	229,850	10	.....	5,772,905	Jan. 1902	.50
Pennsylvania Con., g.	Cal.	5,150,000	51,500	100	20,600	181,925	Nov 1903	.10
Pioneer, g.	Alaska.	5,000,000	50,000	100	.....	300,000	Dec. 1902	6.00
Portland, g.	Colo.	3,000,000	3,000,000	1	360,000	4,657,080	Oct. 1903	.03
Pride of the West, g.	Ariz.	1,500,000	150,000	10	.....	15,000	Oct. 1902	.10½
Quicksilver, pf.	Cal.	4,300,000	43,000	100	21,500	1,931,411	May 1903	.50
Quincy, c.	Mich.	2,500,000	100,000	25	550,000	14,120,000	Aug 1903	3.00
Red Bird, g. s. c. l.	Mont.	1,500,000	300,000	5	33,000	33,000	Nov 1903	.01
Rob Roy, z.	Mo.	15,000	13,825	1	1,701	2,253	Oct. 1903	.02
Rocco-Homestake-Nevada, l. s.	Nev.	300,000	240,000	1	.....	90,000	Nov 1902	.01
Sacramento, g.	Utah	5,000,000	1,000,000	5	60,000	193,000	Dec. 1903	.00½
St. Joseph, l.	Mo.	6,000,000	375,000	10	168,750	3,778,240	Sept. 1903	.15
Silver Hill, g. s.	Nev.	180,000	180,000	1	18,000	28,800	Sept. 1903	.05
Silver King, g. s. l.	Utah	3,000,000	150,000	20	1,100,000	7,150,000	Nov 1903	.66⅔
Smuggler, s. l. z.	Colo.	1,000,000	1,000,000	5	.....	2,175,000	Feb. 1902	.01
Spearfish, g. pf.	So. Dak	1,000,888	882,000	1	88,200	135,810	Dec. 1903	.01
Specie Payment, g.	Colo.	1,000,000	1,000,000	1	.....	40,190	Oct. 1902	.01
Standard Con., g. s.	Cal.	2,000,000	178,394	10	53,517	4,180,331	Sept. 1903	.10
Standard, c.	Ariz.	500,000	500,000	1	40,000	40,000	Sept. 1903	.05
Standard, s. l.	Idaho	500,000	500,000	1	225,000	2,945,000	Sept. 1903	.05
Stratton's Independence, g.	Colo.	5,500,000	1,060,007	5	265,002	4,035,882	Aug 1903	.25
Swansea, s. l.	Utah	500,000	100,000	5	.....	330,500	June 1902	.05
Syndicate, g.	Cal.	100,000	100,000	1	.....	82,000	Aug. 1902	.52
Tamarack, c.	Mich.	1,500,000	60,000	25	.....	8,490,000	Dec. 1901	10.00
Tennessee C.	Tenn.	5,000,000	175,000	25	218,750	218,750	July. 1903	1.25
Tomboy, g. s.	Colo.	1,500,000	300,000	5	.....	1,244,000	July. 1902	.24
Town Topics, g. s.	Colo.	1,000,000	1,000,000	1	15,000	50,000	Nov 1903	.00½
Trinity County, g.	Cal.	1,000,000	99,003	10	34,561	34,561	July. 1903	.05
United, (Creede) g.	Colo.	500,000	500,000	1	10,000	45,000	May. 1903	.02
Union, g.	Colo.	1,250,000	1,250,000	1	.....	445,244	Jan. 1902	.02
United, c. pf.	Mont.	5,000,000	50,000	100	300,000	450,000	Nov 1903	3.00
United, g.	Colo.	5,000,000	3,994,759	1	40,091	319,933	Jan. 1903	.01
United, z. l., com.	Mo.	5,000,000	78,900	7	15,538	30,725	Oct. 1903	.05
United, z. l. pf.	Mo.	1,000,000	18,998	25	34,080	125,356	Oct. 1903	.50
United Verde, c.	Ariz.	3,000,000	300,000	10	1,800,000	14,835,322	Nov 1903	.75
U. S. Red. & Ref., com.	Colo.	6,000,000	59,188	100	295,940	473,168	Dec. 1903	1.00
U. S. Red. & Ref., pf.	Colo.	4,000,000	39,458	100	295,935	532,008	Dec. 1903	1.50
Utah, g.	Utah	1,000,000	100,000	10	12,000	219,000	Oct. 1903	.01
Utah Con., c.	Utah	1,500,000	300,000	5	954,000	1,686,000	July. 1903	1.50
Vindicator Con., g.	Colo.	1,500,000	1,100,000	1	198,000	1,093,000	Oct. 1903	.03
Waldorf, g.	Colo.	3,000,000	3,000,000	1	22,500	47,000	July. 1903	.00¼
Wasp No. 2, g.	So. Dak	500,000	147,900	1	.....	218,410	June 1902	.00½
Wolverine, c.	Mich.	1,500,000	80,000	25	330,000	1,320,000	Oct. 1903	3.00
Yankee Con., g. s. l.	Utah	500,000	500,000	1	.....	75,000	Apr. 1902	.05
Yellow Aster, g.	Cal.	1,000,000	100,000	10	70,000	543,789	Oct. 1903	.10
.....	.....	.....	.....	.....	.....	.....	.....	.....

COAL, IRON AND INDUSTRIALS.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1903.	Total to Date.	Latest. Date.	Amt.
Ala. Con., Coal & Iron, pfd.	Ala.	$2,500,000	$24,638	$100	$172,468	$689,680	Dec. 1903	$1.75
Ala. & Ga. Iron, pfd.	Ala.	650,000	6,500	100	6,500	6,500	Jan. 1903	1.00
Allis-Chalmers, pfd.	U. S.	25,000,000	200,000	100	1,137,500	2,883,750	Nov. 1903	1.75
Alma Oil.	Cal.	400,000	380,000	1	45,600	45,600	Dec. 1903	.03
Amer. Agr. Chem., pfd.	U. S.	20,000,000	181,350	100	1,088,100	4,670,760	Oct. 1903	3.00
American Cement.	Pa.	2,100,000	200,000	10	160,000	540,000	July. 1903	.40
American Coal.	Md.	1,500,000	50,000	25	150,000	1,432,500	Sept. 1903	1.25
Aztec Oil.	Cal.	250,000	235,000	1	14,100	43,050	Sept. 1903	.03
Cambria Steel.	Pa.	50,000,000	900,000	50	1,350,000	6,450,000	Aug. 1903	.75
Central Coal & Coke, com.	Mo.	5,125,000	51,250	100	307,500	551,250	Oct. 1903	1.50
Central Coal & Coke, pfd.	Mo.	1,875,000	18,750	100	93,748	796,872	Oct. 1903	1.25
Central Oil	W. Va.	1,500,000	60,000	25	30,000	152,500	Nov 1903	.25
Colorado Fuel & Iron, com.	Colo.	38,000,000	239,310	100	.....	1,642,500	Apr. 1902	1.75
Colorado Fuel & Iron, pfd.	Colo.	2,000,000	20,000	100	80,000	1,560,000	Feb. 1903	4.00
Columbus & Hocking C. & I.	Ohio.	7,000,000	69,244	100	51,921	86,531	Nov 1903	.25
Consolidated Coal.	Ill.	5,000,000	50,000	100	50,000	150,000	Jan. 1903	1.00
Consolidation Coal.	Md.	10,250,000	102,500	100	205,000	6,536,650	Jan. 1903	2.00
Crucible Steel, pfd.	U. S.	25,000,000	250,000	100	1,312,500	5,250,000	Sept 1903	1.75
Cummings Cement.	N. Y.	300,000	3,000	100	27,000	216,000	July 1903	9.00
Dabney Oil.	Cal.	1,000,000	1,000,000	1	15,000	145,000	Oct. 1903	.00⅝
Dixon, Joseph, Crucible.	N. J	1,000,000	7,345	100	29,380	.....	Oct. 1903	1.00
Empire Steel & Iron, pfd.	U. S.	5,000,000	23,700	100	35,550	355,442	Jan. 1903	1.50
Four Oil.	Cal.	300,000	208,700	1	22,957	50,088	Nov 1903	.01
General Chem., com.	U. S.	12,500,000	74,103	100	370,518	1,300,537	Dec. 1903	1.25
General Chem., pfd.	U. S.	12,500,000	100,000	100	591,240	2,566,418	Oct. 1903	1.50
George's Creek Coal and Iron.	Md.	2,500,000	22,000	100	33,000	.....	Jan. 1903	3.00
Giant Oil.	Cal.	500,000	500,000	1	5,000	5,000	Jan. 1903	.01
Hanford Oil.	Cal.	20,000	2,000	10	.....	13,000	Sept. 1902	1.50
Heywood Oil.	Tex.	800,000	800,000	1	16,000	144,000	Jan. 1903	02
Higgins Oil.	Tex.	2,500,000	17,600	100	.....	96,850	Apr. 1902	1.50
Home Oil.	Cal.	100,000	100,000	1	42,500	492,500	June 1903	06
Homestake Oil.	Cal.	100,000	10,000	10	.....	33,000	Aug 1902	15
Houston Oil, pfd.	Tex.	7,500,000	75,000	100	224,125	896,500	Feb. 1903	3.00
Imperial Oil.	Cal.	1,000,000	100,000	100	220,000	480,000	Nov 1903	20
Int'l Acheson Graphite, pfd.	N. Y.	500,000	5,000	100	35,000	40,000	July. 1903	3.50
Jeff. & Clearf., Coal & Iron, com.	Pa.	1,500,000	15,000	100	75,000	180,000	Aug 1903	5.00
Jeff. & Clearf., Coal & Iron, pfd.	Pa.	1,500,000	15,000	100	75,000	600,500	Aug. 1903	2.50
Lehigh Coal & Nav.	Pa.	14,346,650	286,933	50	573,866	20,668,986	Nov 1903	1.50
Maryland Coal, pfd.	Md.	2,000,000	18,850	100	65,975	951,885	July. 1903	3.50
Monongahela R. Coal, pfd.	Pa.	10,000,000	97,300	5	694,330	3,124,345	July. 1903	3.50
Monte Cristo Oil.	Cal.	500,000	500,000	1	35,000	35,000	Nov 1903	.01
National Carbon, pf.	U. S.	4,500,000	45,000	100	315,000	1,575,000	Nov. 1903	1.75
Ohio & Indiana Natural Gas.	U. S.	10,000,000	900,000	100	360,000	1,440,000	Dec. 1903	1.00
Pacific Coast Borax.	Cal.	2,000,000	19,000	100	209,000	1,516,500	Nov 1903	1.00
Peerless Oil.	Cal.	1,000,000	92,000	10	131,640	177,560	Nov 1903	.14
Pennsylvania Salt Mfg.	Pa.	2,500,000	50,000	50	300,000	13,450,000	Oct. 1903	7.00
Penna. Steel of N. J.	Pa.	25,000,000	168,214	100	1,177,500	3,505,750	Nov. 1902	3.50
Philadelphia Gas, com.	Pa.	16,102,131	308,542	50	925,624	3,416,831	Nov. 1903	.75
Philadelphia Gas, pfd.	Pa.	3,998,350	212,873	50	199,918	1,000,067	Sept. 1903	1.25
Pittsburg Coal, pfd.	Pa.	32,000,000	297,012	100	2,079,084	8,316,336	Oct. 1903	1.75
Pittsburg Oil.	Cal.	300 000	220,000	1	36,000	36,000	Oct. 1903	.02½
Pocahontas Collieries, pf.	W. Va.	1,500,000	15,000	100	82,500	82,500	Nov 1901	.50
Rep. Iron & Steel, pfd.	U. S.	25,000,000	204,169	100	1,429,182	6,053,476	Oct. 1903	1.75
San Joaquin Oil.	Cal.	100,000	100,000	1	25,000	185,000	Aug. 1903	.05
Shelby Iron.	Ala.	1,000,000	10,000	100	150,000	840,000	Nov 1903	5.00
Sloss-Sheffield Steel & Iron, pfd.	Ala.	20,000,000	65,085	100	456,000	1,710,000	Oct. 1902	1.75
St. Bernard Coal & Coke.	Ky-Ten.	1,000,000	10,000	100	.....	770,000	Dec. 1903	6.00
Standard Oil (of N. J.).	U. S.	100,000,000	970,000	100	42,680,000	206715,000	Dec. 1903	12.00
Susquehanna Iron & Steel, pf.	Pa.	1,500,000	300,000	5	90,000	762,500	June. 1903	.15
Temple Iron.	Pa.	240,000	2,400	100	14,400	21,500	July. 1903	3.00
Tenn. C. I. & R. R., com.	Tenn.	23.000.000	225,531	100	.....	1,102,600	Nov 1903	2.00
Tenn. C. I. & R. R., pfd.	Tenn.	248,000	2,480	100	19,840	307,104	Nov 1903	2 00
Tex. & Pacific Coal.	Tex.	2,000.000	20.000	100	120,000	2,160,000	Oct. 1903	1.50
Thirty-three Oil.	Cal.	500.000	100,000	5	110,000	230,000	Nov 1902	10
Thomas Iron.	Pa.	2,500.000	25.000	200	.....	200,000	Aug 1903	4 00
Tidewater Steel, pfd.	Pa.	600,000	60.000	1	30,000	30,000	July. 1903	.20
Union Oil.	Cal.	10,000,000	52,672	100	73,740	370,870	Oct. 1903	.70
U. S. Steel Corp., com.	U. S.	550,000,000	5,084,952	100	17,790,888	53,350,978	Dec. 1903	.50
U. S. Steel Corp., pfd.	U. S.	550,000,000	5,103,141	100	35,719,876	98,192,496	Nov. 1903	1.75
Va.-Carolina Chem., Com.	U. S.	38,000,000	279,844	100	699,610	3,678,829	June. 1903	1 25
Va.-Carolina Chem., pfd.	U. S.	2,000,000	120,000	100	960,000	7,020,800	Oct. 1901	2.00
Victoria Coal & Coke, com.	W. Va.	150,000	1,500	100	.....	15,000	Jan. 1902	10.00
Victoria Coal and Coke, pfd.	W. Va.	100,000	1,000	100	.....	15,000	July 1903	3.00
Westmoreland Coal.	Pa.	5,000,000	250,000	50	750,000	8,250,000	Sept. 1903	1 50
West Shore Oil.	Cal.	100.000	100.000	1	60,000	105,000	Dec. 1903	05
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	par val	Dividends. Paid 1903.	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia, g s.	Mex.	$480,000	9,600	$50	$83,250	$165,286	Oct. 1903	$1.08
Barreno, g. s.	Mex.	.....	2,400	....	14,404	67,954	Aug. 1903	.85
Bartolome de Medina Mill.	Mex.	50,000	2,000	25	15,975	78,458	Nov 1903	.69
Buena Vista, g. s.	Mex.	100,000	1,000	199	5,000	5,000	June 1903	5.00
Butters' Salvador, g.	Salv.	750,000	150,000	5	216,000	216,000	Oct. 1903	.48
Cariboo McKinney, g. s.	B. C.	1,200,000	1,250,000	1	.....	496,837	Mar. 1902	.01½
Carmen, g. s.	Mex.	27,500	1,100	25	23,999	80,464	Oct. 1903	2 67
Carmen-Guanajuato, g. s.	Mex.	725,000	145,000	5	18,125	27,750	Oct. 1903	.12½
Cinco Senores.	Mex.	.....	2,000	....	55,870	711 935	July. 1903	4.10
Copiapo, c.	Chile	1,125,000	112,500	10	39,900	2,865,900	Feb. 1903	.36
Dolores, g. s.	Mex.	100,000	100,000	1	25,000	25,000	Jan. 1905	.25
Dominion Iron & Steel, pf.	N. S.	5,000,000	50,000	100	350,000	875,000	Sept. 1903	3.50
Dominion Coal, pf.	N. S	3,000,000	30,000	100	180,000	2,340,000	July. 1903	2.00
Dos Estrellas, g. s.	Mex.	150,000	3,000	50	344,925	569,925	Nov 1903	13.88
El Oro, g. s.	Mex.	5,750,000	1,080,000	5	810,000	2,320,000	July. 1903	.36
Esperanza, s. g.	Mex.	150,000	3,000	50	84,120	1,154,199	Aug. 1903	4.40
Fraternal, s.	Mex.	5,000	1,000	5	21,763	51,263	Nov 1903	2.18
Goodenough, s. l.	B. C.	800,000	659,400	1	.....	13,188	Jan. 1902	.01
Granby, Con.	B. C.	13,333,030	1,336,303	10	133,630	133,630	Dec. 1903	.10
Greene Con., c.	Mex.	7,200,000	720,000	10	431,820	651,820	May. 1903	.20
Guadalupana, g. s. l.	Mex.	10,000	3,000	5	6,930	6,930	Mar 1901	.77
Guadalupe Mill.	Mex.	1,000,000	10,000	100	30,800	3,515,750	Apr. 1903	.77
Le Roi, g.	B. C.	5,000,000	200,000	25	.....	1,305,000	Nov 1899	1.20
Le Roi No. 2, g.	B. C.	3,000,000	120,000	35	.....	288,000	May. 1902	1.20
Mesquital, g. s.	Mex.	125,000	250,000	½	15,000	51,458	Feb. 1903	.06
Metallurgical Co, of Torreon.	Mex.	1,500,000	30,000	50	264,500	269,500	Apr. 1903	8.98
Natividad, s. g.	Mex.	36,000	2,400	15	96,840	260,488	Nov 1903	5.00
N. Y. & Hond. Rosario, s. g.	C. A.	1,500,000	150,000	10	.....	1,770,000	Nov 1902	.10
North Star, s. l.	B. C.	1,500,000	1,300,000	1	.....	581,356	Dec. 1902	.01
Nova Scotia St. & Coal, com.	N. S.	5,000,000	41,200	100	247,200	515,000	Oct. 1903	3.00
Nova Scotia St. & Coal, pfd.	N. S.	2,000,000	10,300	100	82,400	205,000	Oct. 1903	2.00
Providence, g. s.	B. C.	200,000	5,560	5	1,668	1,668	Nov 1903	.10
Providencia (S. J.).	Mex.	90,000	6,000	15	9,240	169,740	Feb. 1903	.77
Rambler-Cariboo, s. l.	B. C.	1,250,000	1,250,000	1	.....	230,000	Nov 1902	.01½
Real del Monte, g. s.	Mex.	.....	2,554	....	42,652	2,915,902	Aug. 1903	4.40
St. John del Rey, g.	Brazil	3,000,000	546,265	5	152,954	14,158,949	Dec. 1903	.12
Soledad, s. l.	Mex.	18,200	960	20	34,215	256,456	Nov 1903	4.32
Sorpressa, g. s.	Mex.	19,200	960	20	14,412	200,066	Nov 1903	4.32
Sta. Maria de Guadalupe, g. s.	Mex.	2,500	2,500	1	.....	377,918	Sept. 1902	4.08
Sta. Maria de la Paz, g. s.	Mex.	.....	2,400	....	108,820	1,957,093	Nov 1903	8.65
San Francisco Mill.	Mex.	50,000	6,000	25	.....	284,700	Nov. 1902	.40
Sta. Gertrudis, g. s.	Mex.	1,920,000	38,000	50	147,144	2,784,488	Oct. 1903	.....
San